31

COMPARISON OF COST OF IMPORTING WATER TO NORTH SANTA CLARA VALLEY FROM HETCH HETCHY, SOUTH BAY AQUEDUCT AND/OR PACHECO AQUEDUCT

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CIVIL ENGINEERS
1046 WEST TAYLOR STREET
SAN JOSE, CALIFORNIA

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COMPARISON OF COST OF IMPORTING WATER TO NORTH SANTA CLARA VALLEY FROM HETCH HETCHY, SOUTH BAY AQUEDUCT AND/OR PACHECO AQUEDUCT

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REPORTS
STRUCTURES
MUNICIPAL AND CIVIL PROJECTS

October 12, 1961

61-41

Glenn F. Dodson, Executive Administrator
Santa Clara Valley Water Conservation District
15420 Almaden Road
San Jose, California

Dear Mr. Dodson:

Enclosed herewith is the response to your September 27, 1961 letter to Dean Sullivan, relative to the comparison of five different projects of water importation to this County; each serving in combination with an ultimate Hetch Hetchy service of 115,000, 40,000 and 27,000 acre feet, respectively. The five projects are:

1. Interim South Bay Aqueduct, plus South Bay Aqueduct.
2. South Bay Aqueduct exclusively.
3. South Bay Aqueduct in 1964, plus Pacheco Aqueduct (Federal Project) in 1970.
4. Interim Pacheco Project in 1963, converted to completed Federal Project in 1970.
5. Federal Project alone, starting in 1970.

The comparison of these projects was used in presentation to the Santa Clara Valley Water Conservation District Board of Directors on the afternoon of October 10, 1961, and the Santa Clara County Water Commission on the afternoon of October 11, 1961. It is believed that the information is very useful in studying the alternatives, in that it covers a scope of project alternates in combination with a scope of schedules.

The information presented includes:

1. A statement of assumptions.
2. Project cost curves for each of the 15 alternates.
3. Cutouts of the cost curves arranged for purposes of analysis.
4. Instructions in using the cutouts for analysis.
5. A cost summary sheet.
6. Pertinent observations.

We consider that answering this letter has been part of our basic assignment from the Tri County Water Authority to compare the projects. Extra copies of the reply are submitted in accordance with your request of October 11, 1961.

Yours very truly,

CREEGAN AND D'ANGELO
CIVIL ENGINEERS

By Patrick J. Creegan
Patrick J. Creegan

PJC/m
Encl.

ASSUMPTIONS

The cost curves which follow compare the fifteen projects on the basis of total annual cost, from now to the year 2020, for the construction, maintenance and operation of facilities to their respective termini.

TERMINI

Hetch Hetchy

Meters in service area.

Pacheco Aqueduct

Foot of Anderson Dam, at Elevation 420. Included is a terminal pump station which is estimated to lift 50% of the Pacheco Aqueduct imported water either into Calero or Anderson Dams. When providing service to the Hetch Hetchy area Pacheco Aqueduct water is assumed pumped to 590 to be on an equivalent basis with South Bay Aqueduct.

South Bay Aqueduct

Near Airpoint Reservoir, at Elevation 470. The costs of Airpoint Reservoir are not included.

NOTE: In making these assumptions no costs are included for internal distribution within the service area. These costs are not included because to include them would open the study to a new labyrinth of alternates. It was judged that under any scheme and schedule of importation that the proper ultimate development of the internal distribution system would be essentially the same as under any alternate scheme. For this reason, so as to compare projects on the bases of their differences, the internal distribution costs are left out.

QUANTITY OF WATER IMPORTED

The top curve on each of the fifteen cost sheets shows the schedule of water importation. The top line of that curve is the Bureau of Reclamation's estimate for the total supplemental water demand in the North Santa Clara service area. The lines below the top line indicate the assumed amounts of water brought in from the three respective aqueducts so as to make up the total requirements. In those projects which assume 115,000 AF of Hetch Hetchy service in 2020, the ordinates between the top two lines represent the City of San Francisco forecast.

SERVICE AREA

The service area considered is delineated in the Interim Pacheco Project Report, Plate I, as Zones 1 and 2. These zones include the valley land in North Santa Clara County from Morgan Hill to Milpitas, including the City of Palo Alto. The Hetch Hetchy service area referred to as Zone 1 in the Interim Pacheco Report is that part of the total service area taking in the Bay front cities from Milpitas to Palo Alto.

TREATMENT COSTS

Treatment costs are presented only for that portion of the water presumed served by either the South Bay Aqueduct or the Pacheco Aqueduct to the Hetch Hetchy service area.

ASSUMPTIONS

TREATMENT COSTS (Continued)

Treatment costs are thus included only for those alternates which assume restricted development of the San Francisco service. The tables which follow show the assumed treatment costs. These tables are supported in Appendix A and are based on an assumed schedule of construction of treatment plants. Construction costs and maintenance and operation costs are based on current estimates, increased as appropriate to account for cost escalation. Data for costs of treating water were received from the Santa Clara County Flood Control and Water Conservation District.

HETCHY HETCHY LIMITED TO A MAXIMUM OF 27,000 AF/Yr

Year	Q. Treated (A.F.)	Maintenance & Operation ($/A.F.)	Principal & Interest in $1000	Remarks
1970				Initial 10 million gal/day plant. Cost $3.4 Million.
1974	8,000	10.00	172	
1975	9,000	9.64	172	
1980	17,000	7.35	172	
1981	19,000	7.00	172	1984 - 10 million gal/day plant addition. Cost $3.1 Million.
1985	23,000	6.50	329	
1990	30,000	5.79	329	
1994	36,000	5.38	329	1998 - 10 million gal/day plant addition. Cost $4.11 Million.
2000	46,000	4.84	535	
2002	51,000	4.65	535	
2003	53,000	4.60	535	
2004	55,000	4.52	535	2008 - 10 million gal/day plant addition. Cost $4.83 Million.
2009	66,000	4.20	779	
2010	69,000	4.12	779	
2013	74,000	4.00	779	End repayment period. Initial plant.
2014	77,000	3.92	607	
2020	88,000	3.72	607	

Average Treatment Cost $/A.F. = $14.90

ASSUMPTIONS

TREATMENT COSTS (Continued)

HETCH HETCHY LIMITED TO A MAXIMUM OF 40,000 AF/YR

Year	Q. Treated (A.F.)	Maintenance & Operation ($/A.F.)	Principal & Interest in $1000	Remarks
1980	4,000	15.00	203	Initial 10 million gal/day plant Cost $4.02 Million
1981	5,500	12.00	203	
1989	14,000	7.95	203	
1990	17,000	7.35	203	
1997	29,000	5.80	392	1993 - 10 million gal/day plant addition. Cost $3.75 Million
2000	33,000	5.58	392	
2002	38,000	5.26	392	
2003	40,000	5.14	392	
2004	42,000	5.02	392	
2005	45,000	4.90	626	2005 - 10 million gal/day plant addition. Cost $4.62 Million
2006	47,000	4.82	626	
2009	53,000	4.60	626	
2010	56,000	4.50	626	
2018	70,000	4.10	892	2014 - 10 million gal/day plant addition. Cost $5.26 Million
2019	72,000	4.05	892	
2020	75,000	3.95	689	

Average Treatment Cost $/A.F. = $17.00

WATER COST

Hetch Hetchy (At meter on Hetch Hetchy Aqueduct)

Immediate future through 1970	$64/AF
1971 through 1978	61/AF
After 1978	51.50/AF

These figures are based on remarks by Robert C. Kirkwood, Manager of Utilities, City of San Francisco, made before the Santa Clara Water Commission on May 17, 1961. In those plans where it is proposed to limit the Hetch Hetchy supply to less than 115,000 AF/year in 2020, the cost of Hetch Hetchy water is based on the water rate in effect when the limit of Hetch Hetchy supply is reached.

South Bay Aqueduct

From Central Valley Project at Delta Mendota Canal (rate set by USBR) - 1964-1966

Agricultural use	$ 3.50/AF
M&I use	$10.00/AF

ASSUMPTIONS

WATER COST (Continued)

South Bay Aqueduct (continued)

From Delta Water Project at Delta (estimated by State Dept. Water Resources)

1967-1969	$ 3.50/AF
1970-July 1, 1981	4.68/AF
After July 1, 1981	6.30/AF

Pacheco Pass

From Central Valley Project at Delta Mendota Canal (rate set by USBR) - 1963-1966

Agricultural use	$ 3.50/AF
M&I use	$10.00/AF

From San Luis Project at San Luis Forebay
After 1966. This rate has not yet been established. For cost curves same rate as present rate for Central Valley Project was used. (See notes on "Considering the Cost Comparison Sheet").

CAPITAL COST

South Bay Aqueduct

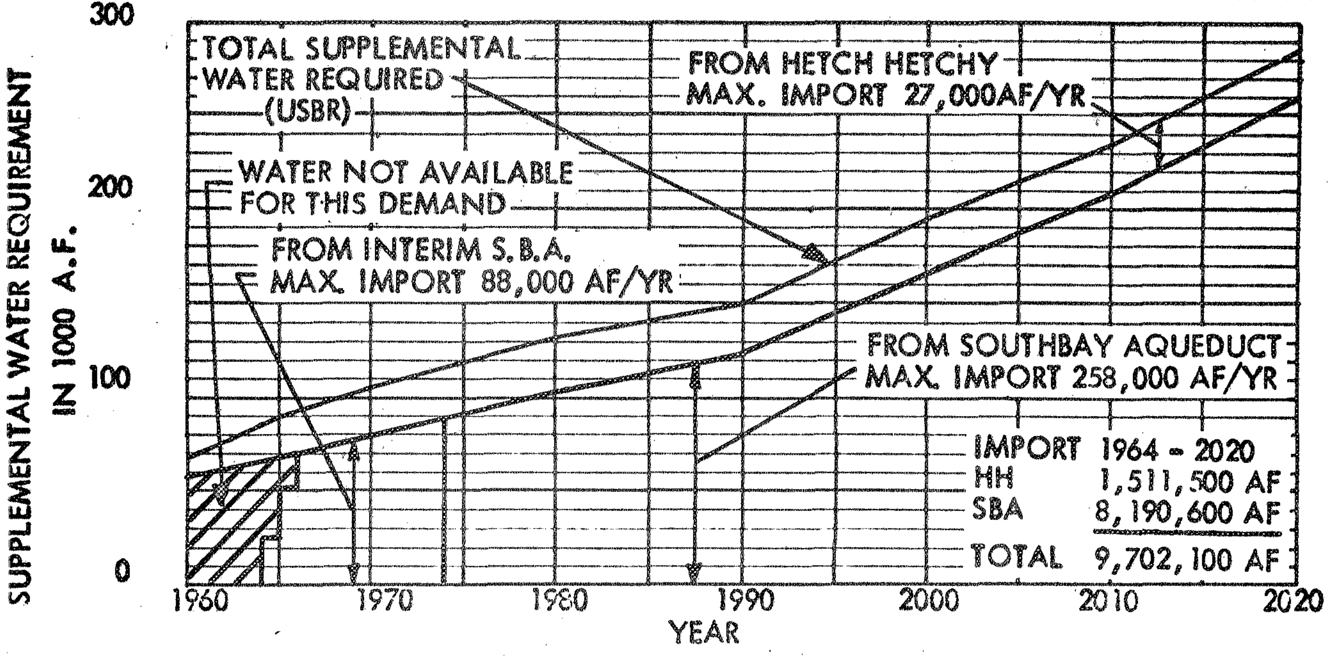
SBA - Interim Project	$12,900,000	(cost estimate by Creegan and D'Angelo
SBA - to 88,000 AF capacity	$19,413,000	(cost estimate of Santa Clara County share of total cost by State Department of Water Resources.

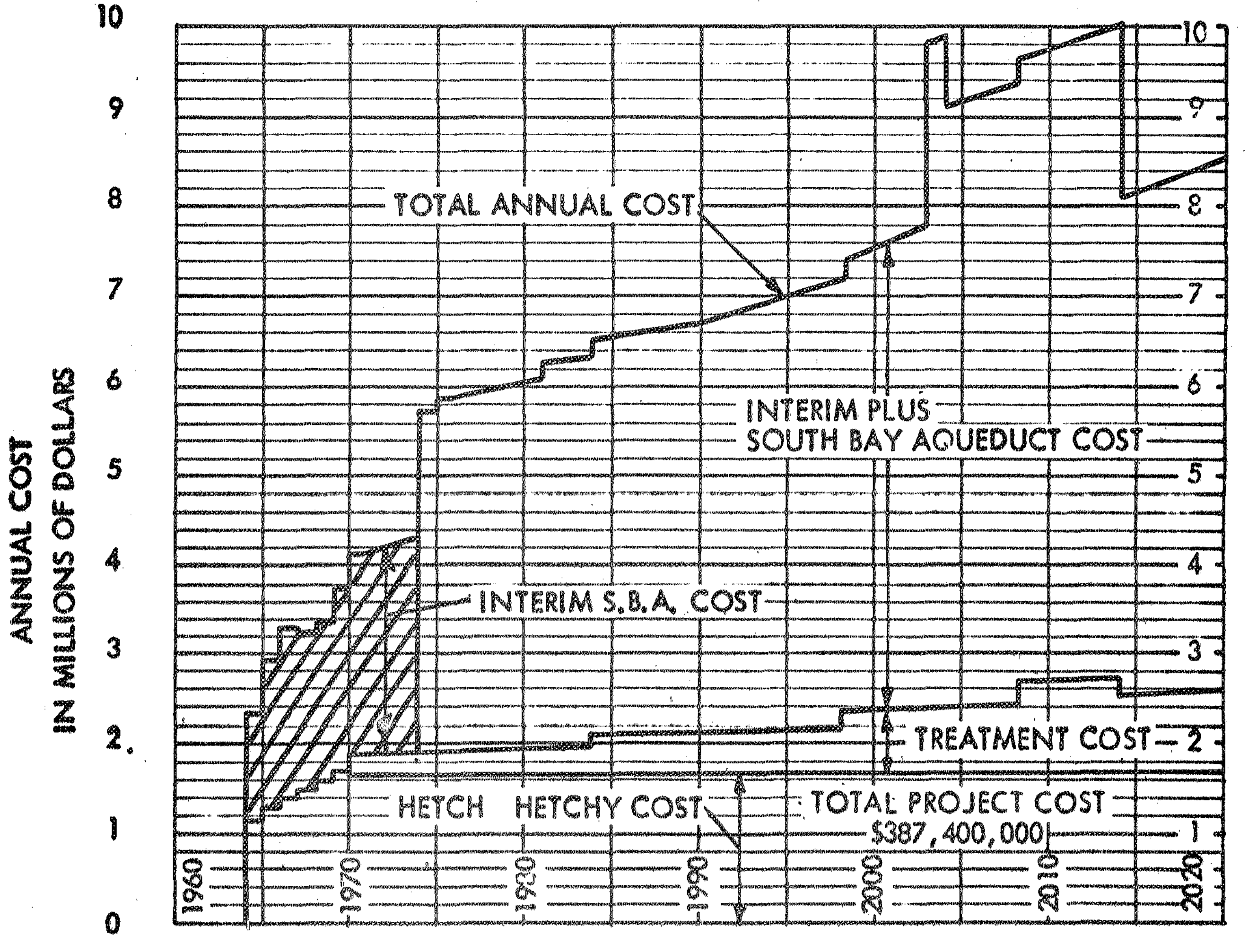
SBA - Over 88,000 AF capacity. The costs of a second and third South Bay Aqueduct project to provide additional 88,000 AF/yr increments of capacity were based on duplication of Santa Clara County's share of the initial 88,000 AF/yr capacity system ($19,413,000). It was assumed that the possible savings in constructing a parallel system would be offset by the possibility that Santa Clara County would have to construct the parallel aqueduct without the aid of Alameda and Contra Costa Counties. Current costs were escalated at the rate of 3% per year (beginning in 1970) to the year of construction.

Pacheco Pass

Interim Project & Final Project

Interim cost	$20,600,000	
Cost of additions in 1970 by USBR	$23,700,000	
North Santa Clara share of additions	$ 9,021,000	(Hetch Hetchy to 115,000 AF/yr)
	$10,951,000	(Hetch Hetchy to 40,000 AF/yr)
	$11,651,000	(Hetch Hetchy to 27,000 AF/yr)





SANTA CLARA-ALAMEDA-SAN BENITO WATER AUTHORITY

ANNUAL COST

INTERIM SOUTH BAY AQUEDUCT, SOUTH BAY AQUEDUCT
AND 27,000 AF/YR MAXIMUM FROM HETCH HETCHY

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ASSUMPTIONS

CAPITAL COST (Continued)

Federal Project alone, starting in 1970	$41,700,000

The share of Pacheco Aqueduct (either Interim or Federal Project) which would be repaid by Santa Clara County and by other areas served by the Pacheco Aqueduct was apportioned on the basis of the total water to be supplied by Pacheco Aqueduct to these areas between 1970 and 2020 (total use of Pacheco Aqueduct by South Santa Clara, San Benito, and Watsonville after 1970 is 4,340,000 A.F.)

REPAYMENT

Repayment of capital costs is based on equal annual payments over a period of 40 years. The following interest rates were used:

For State and locally finaned projects	4%
For Federal Project	
Agricultural Use	0%
Municipal & Industrial Use	2-1/2%

NOTE: Agricultural use to North Santa Clara after 1970 is 1,130,000 A.F.

The allocation of the Federal project costs between agricultural users and municipal and industrial users was based on the total water requirements to be supplied for these uses by the Pacheco Aqueduct between 1970 and 2020. It was further assumed that all water imported by Hetch Hetchy and the South Bay Aqueduct would meet municipal and industrial demands exclusively.

It was further assumed, in considering the Interim Pacheco Project, that the cost advanced for interim construction by local interests would be applied to the municipal and industrial use portion of the Federal project cost.

MAINTENANCE AND OPERATION

Power required for pumping was computed on the basis of a pumping plant having an 80% efficiency.

Power charges were assumed at:

$0.004/KWH for USBR Power
(applicable to Pacheco Projects at all times, and to South Bay Aqueduct between 1964 and 1968)

$0.008/KWH for State Power
(applicable to South Bay Aqueduct after 1968)

Annual maintenance charges were computed on the basis of the following:

Pumping station maintenance and replacement
2.2% of capital cost of pumping station

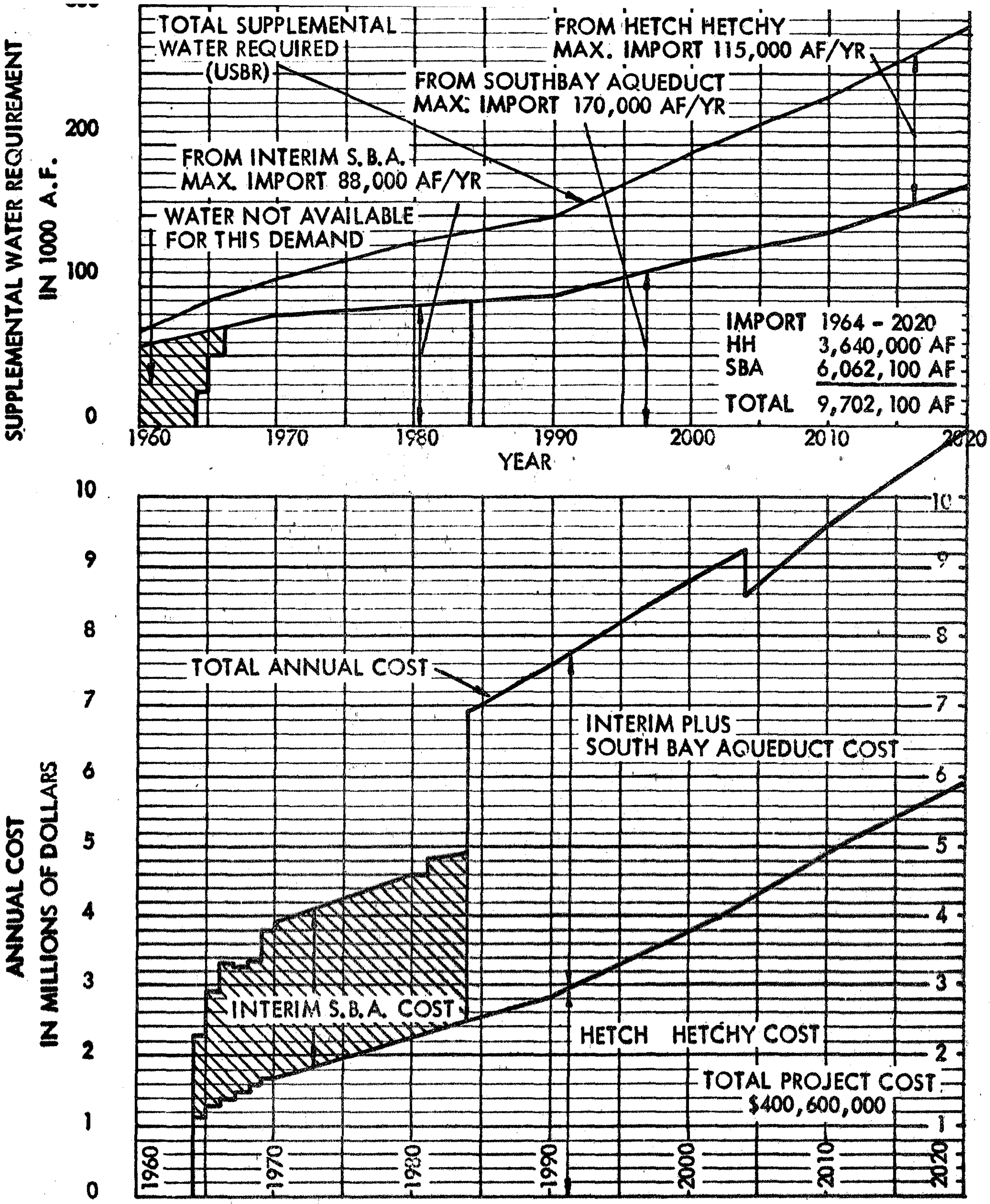
Pumping station manpower
$60,000 for one pumping station
$90,000 for two or more pumping stations.

ASSUMPTIONS

MAINTENANCE AND OPERATION (Continued)

Pipeline maintenance	0.25% of capital cost of pipeline
Canal maintenance	0.60% of capital cost of canal
Tunnel	0.05% of capital cost of tunnel
Reservoir	0.25% of capital cost of reservoir

Maintenance charges were apportioned between Santa Clara County and other users, on the basis of the total water to be supplied between the years 1970 and 2020.



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AND 115,000 AF/YR MAXIMUM FROM HETCH HETCHY

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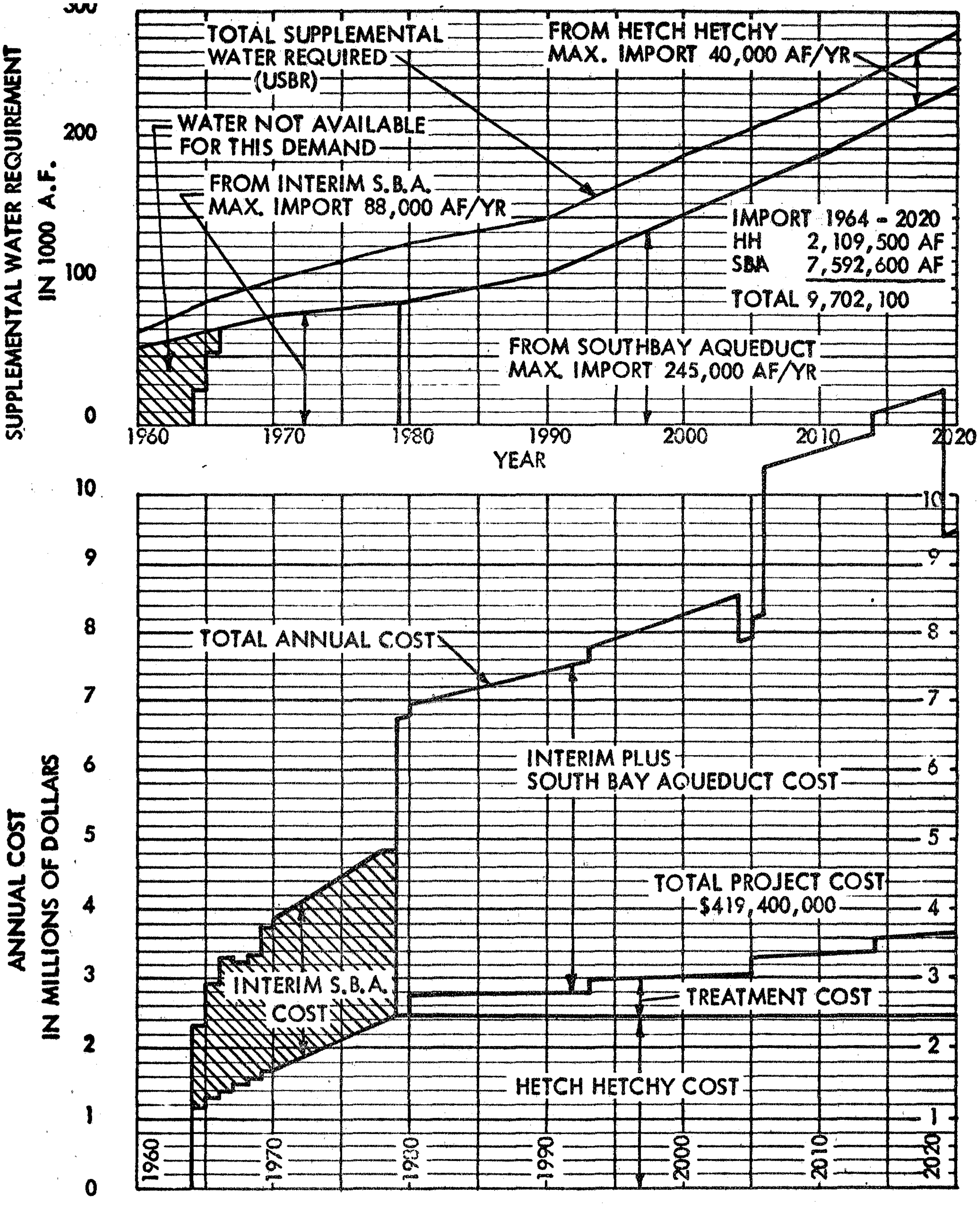

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ANNUAL COST

INTERIM SOUTH BAY AQUEDUCT, SOUTH BAY AQUEDUCT
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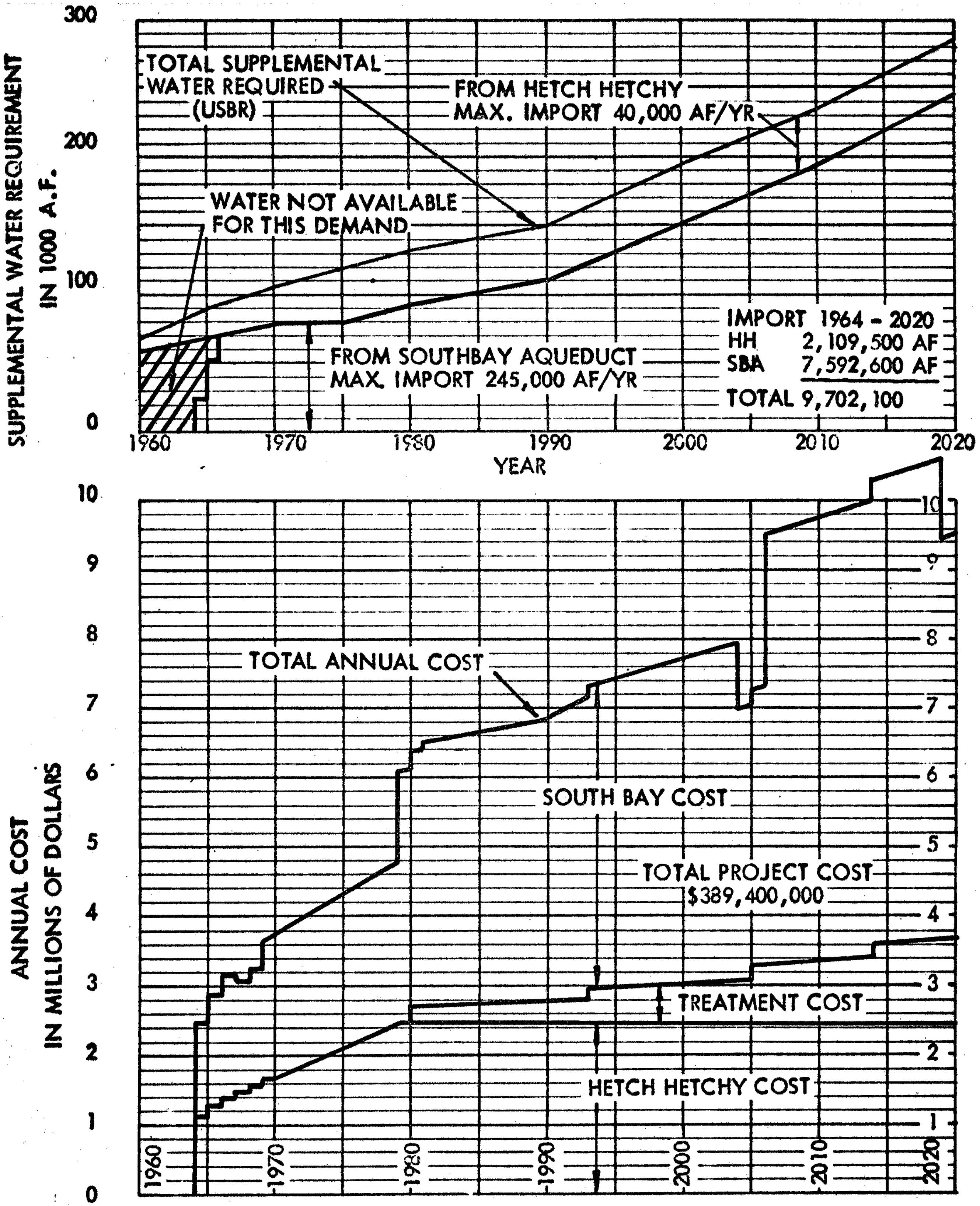

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ANNUAL COST

SOUTH BAY AQUEDUCT
AND 40,000 AF/YR MAXIMUM FROM HETCH HETCHY

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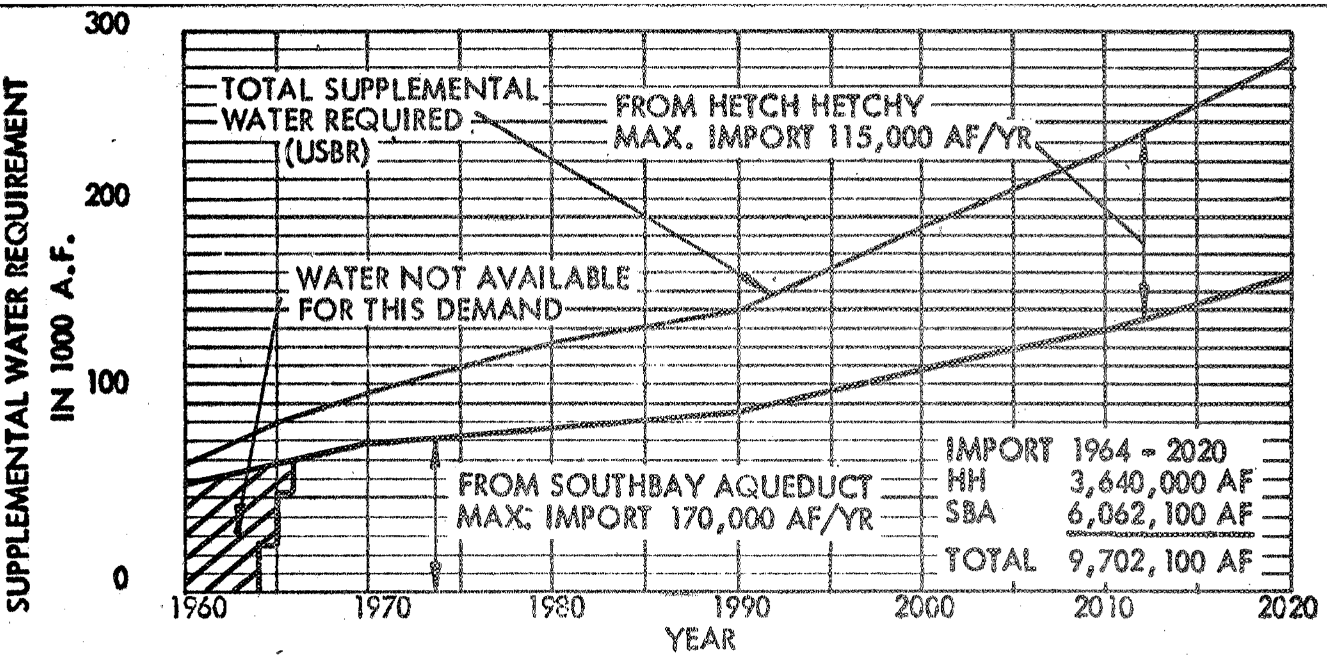

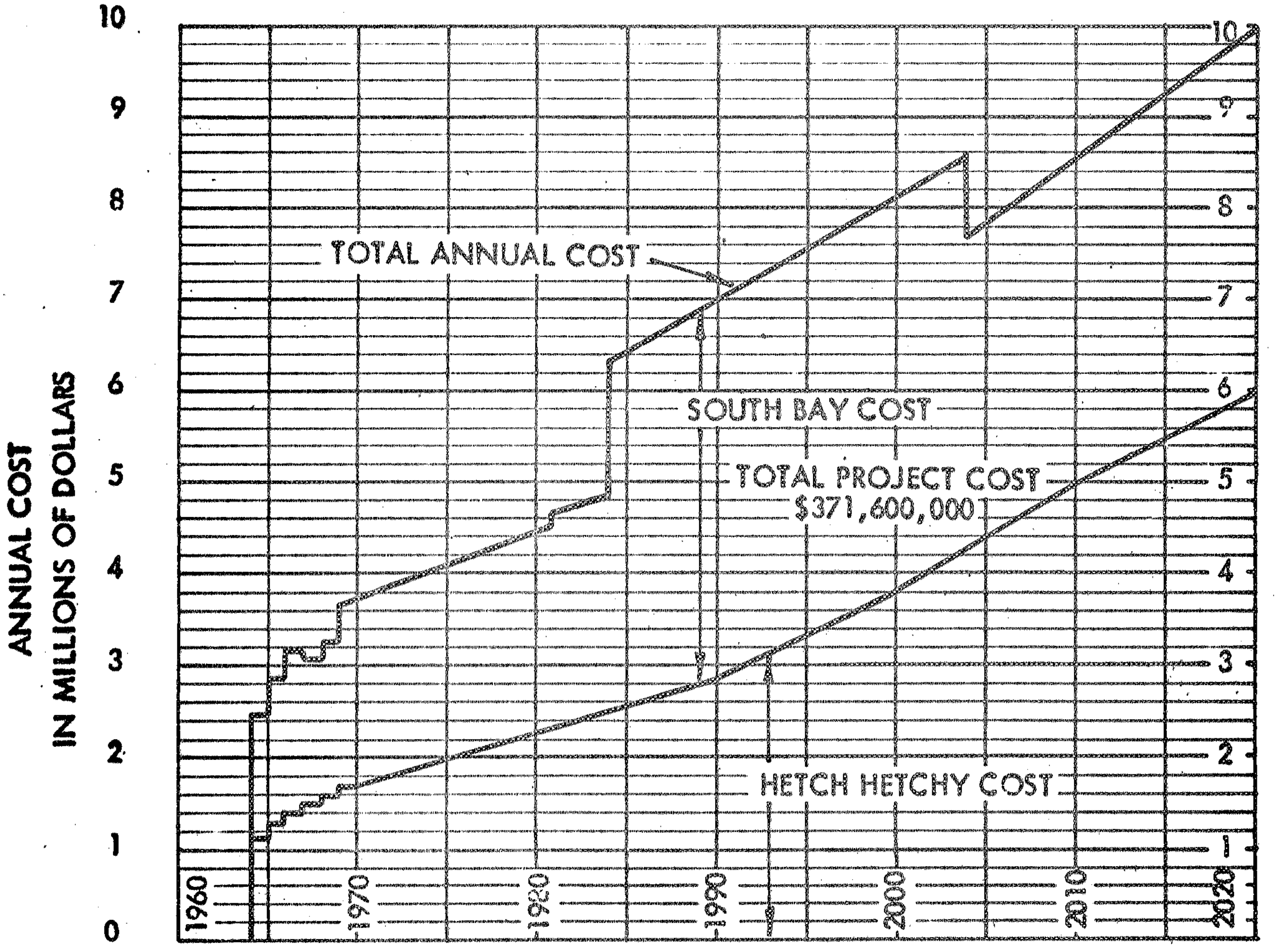

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SOUTH BAY AQUEDUCT
AND 115,000 AF/YR MAXIMUM FROM HETCH HETCHY

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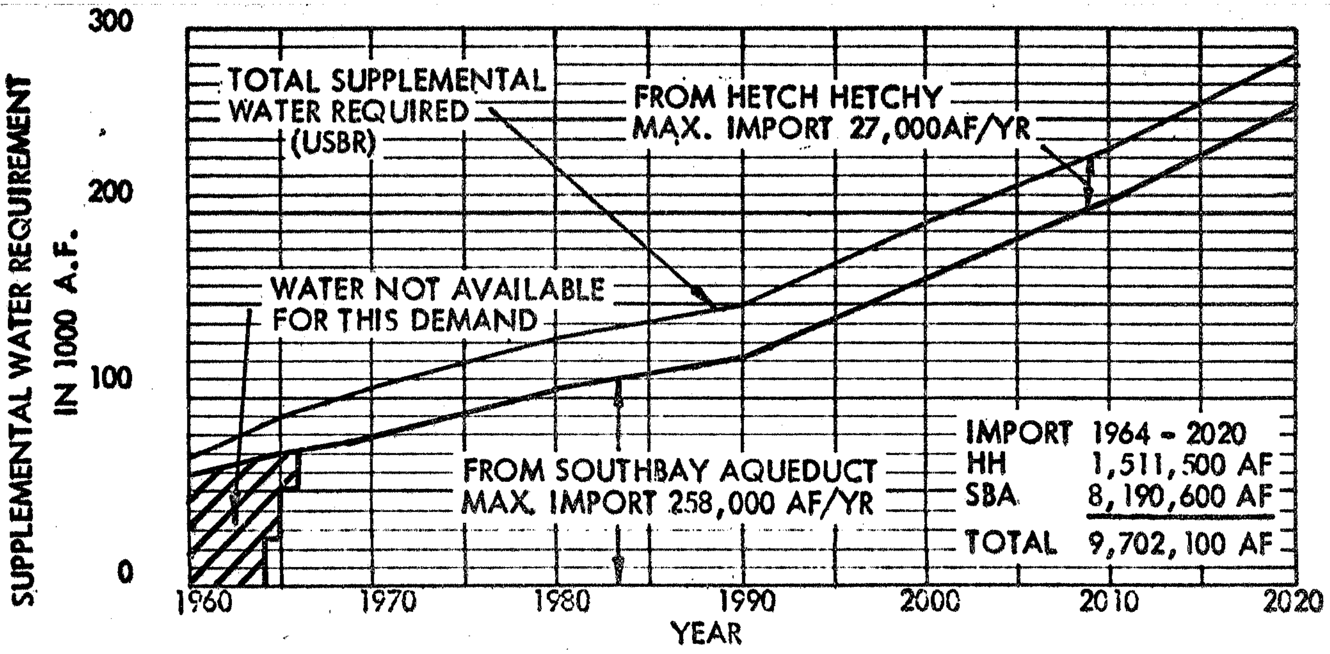

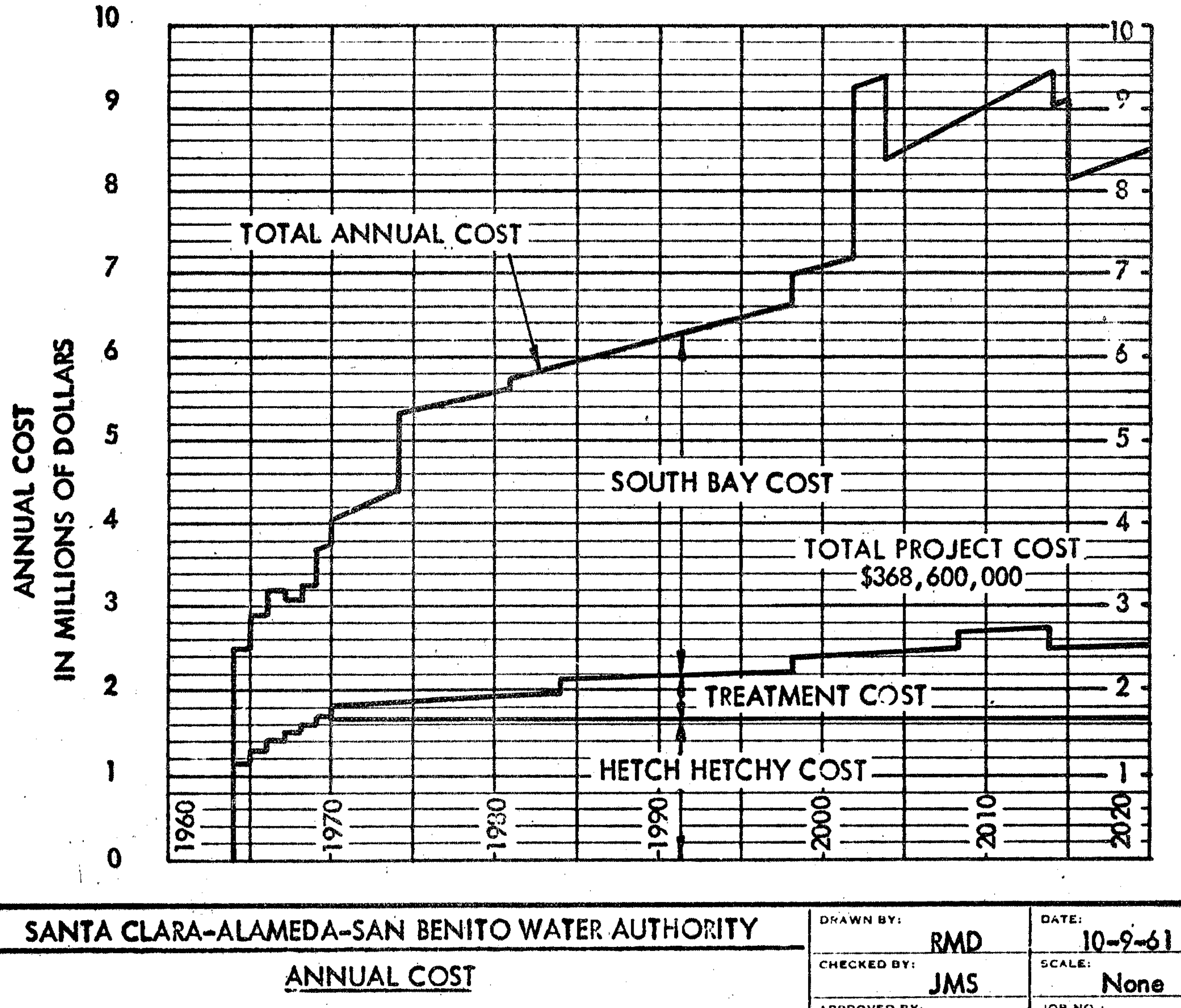

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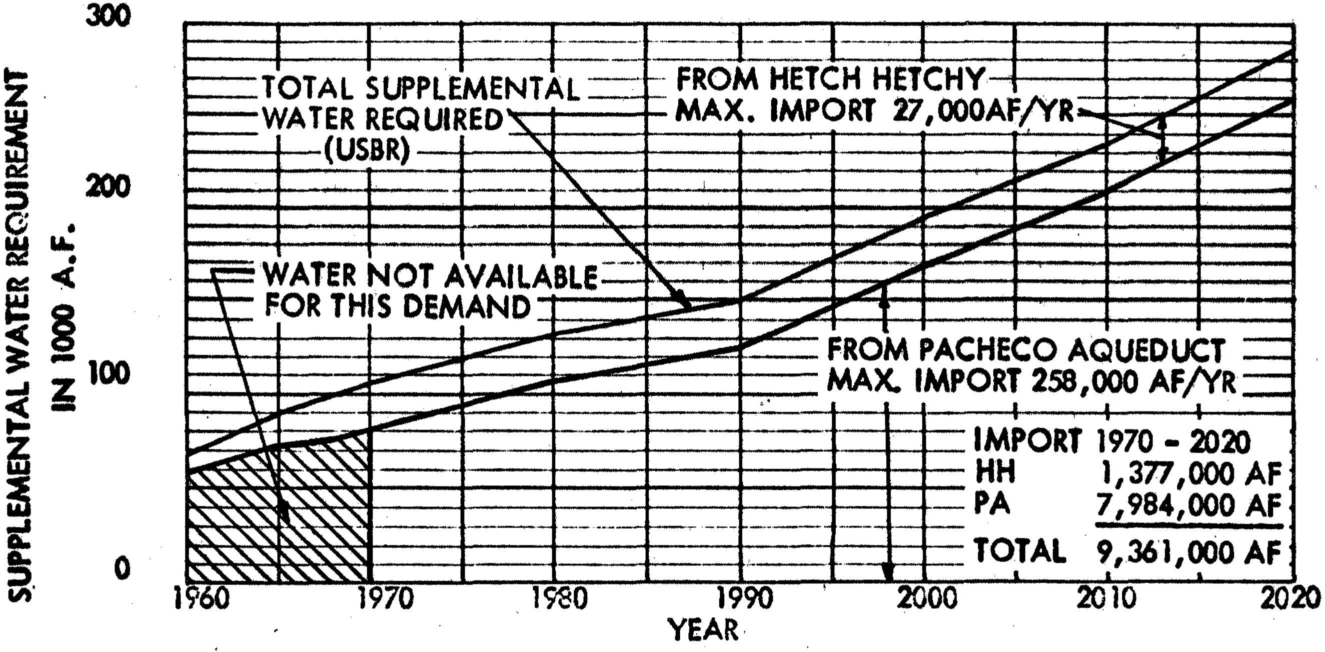

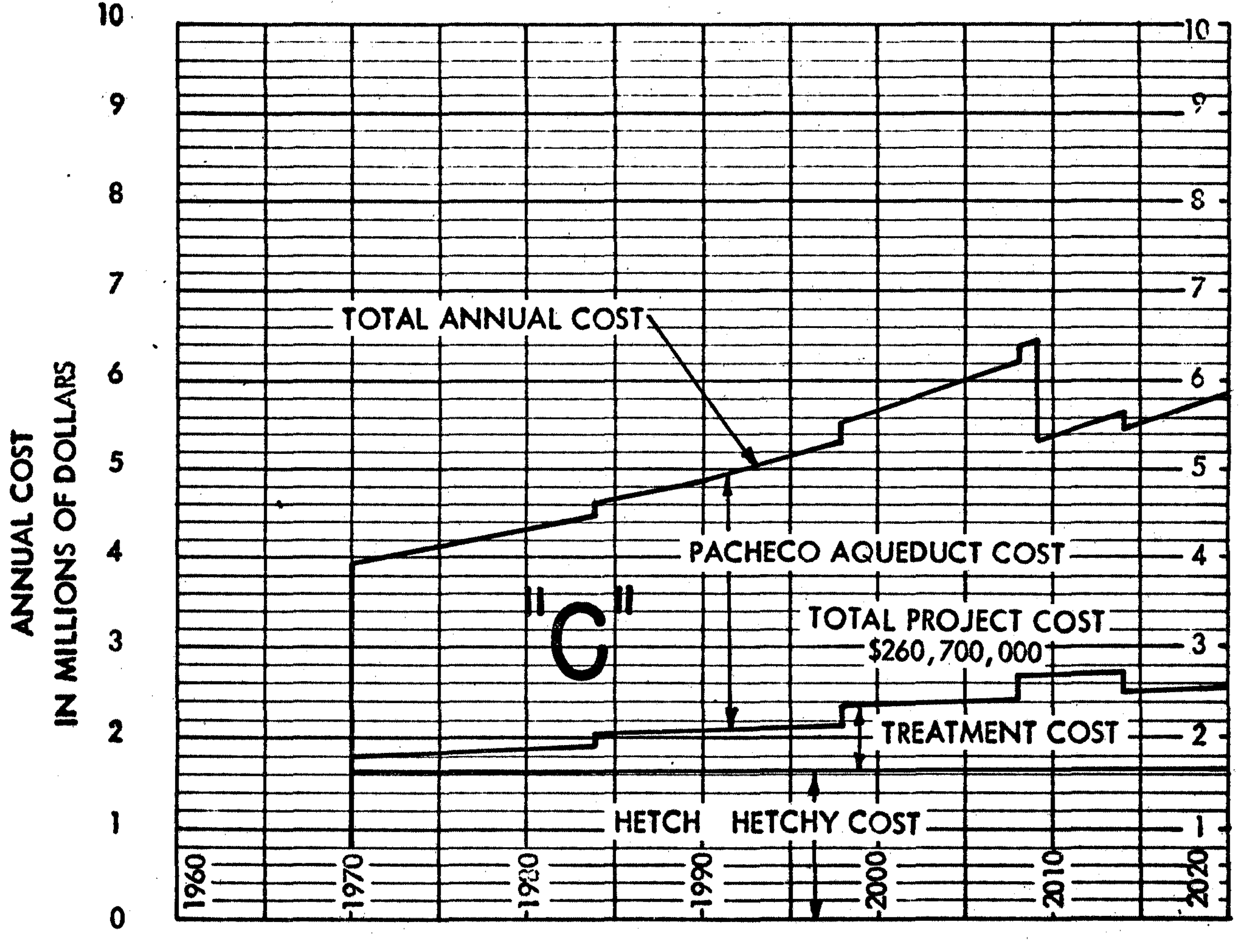

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ANNUAL COST

PACHECO AQUEDUCT
AND 27,000 AF/YR MAXIMUM FROM HETCH HETCHY

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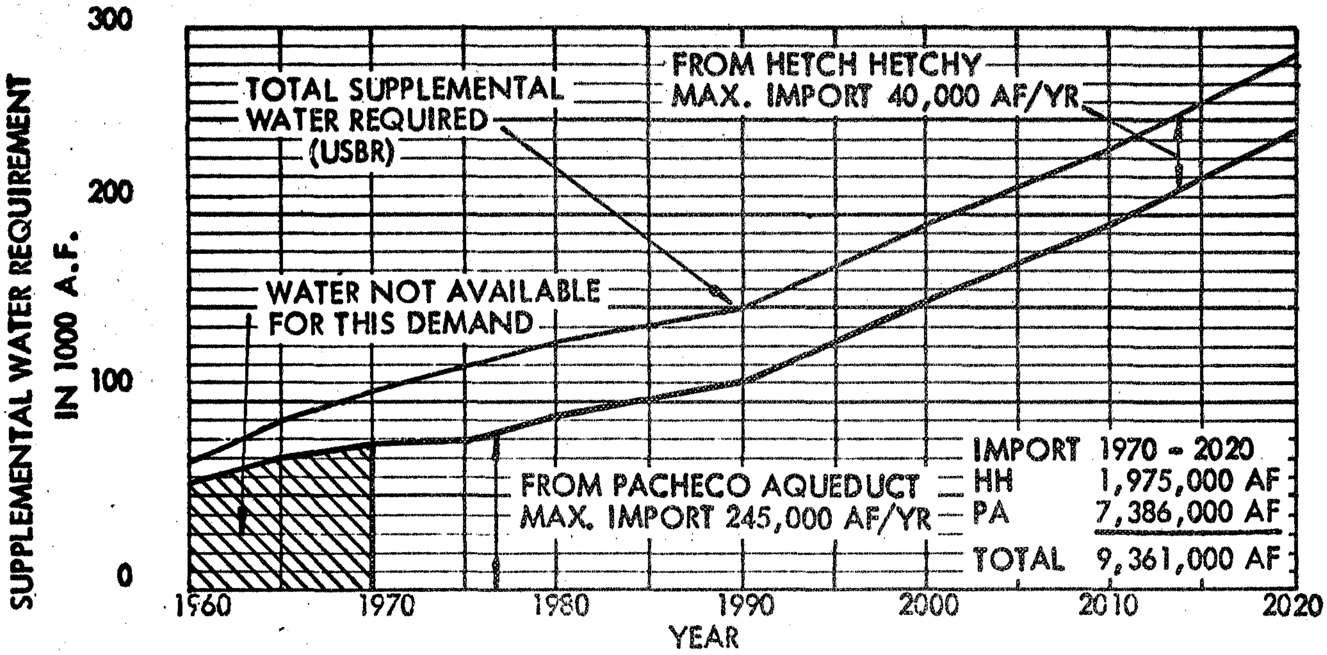

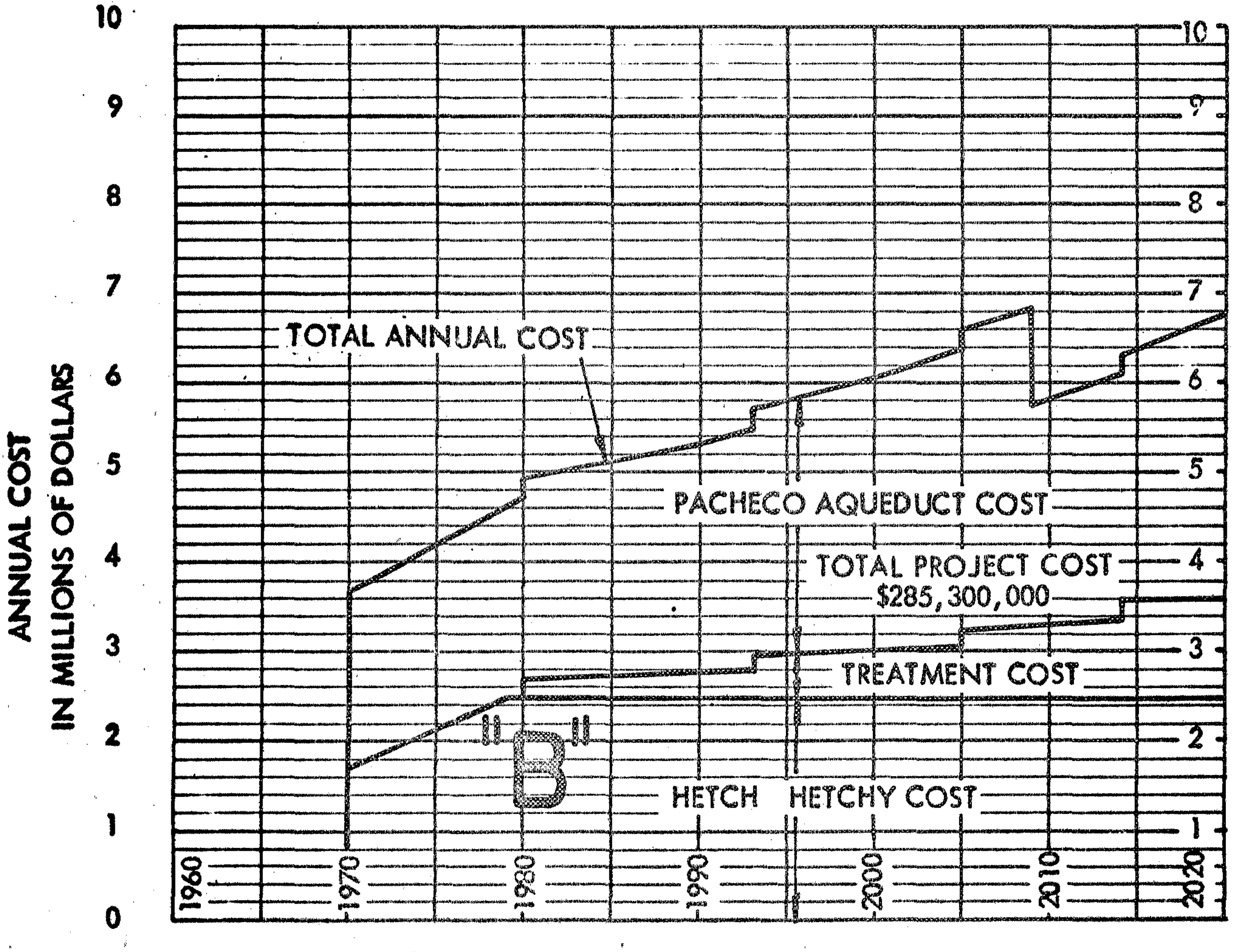

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PACHECO AQUEDUCT
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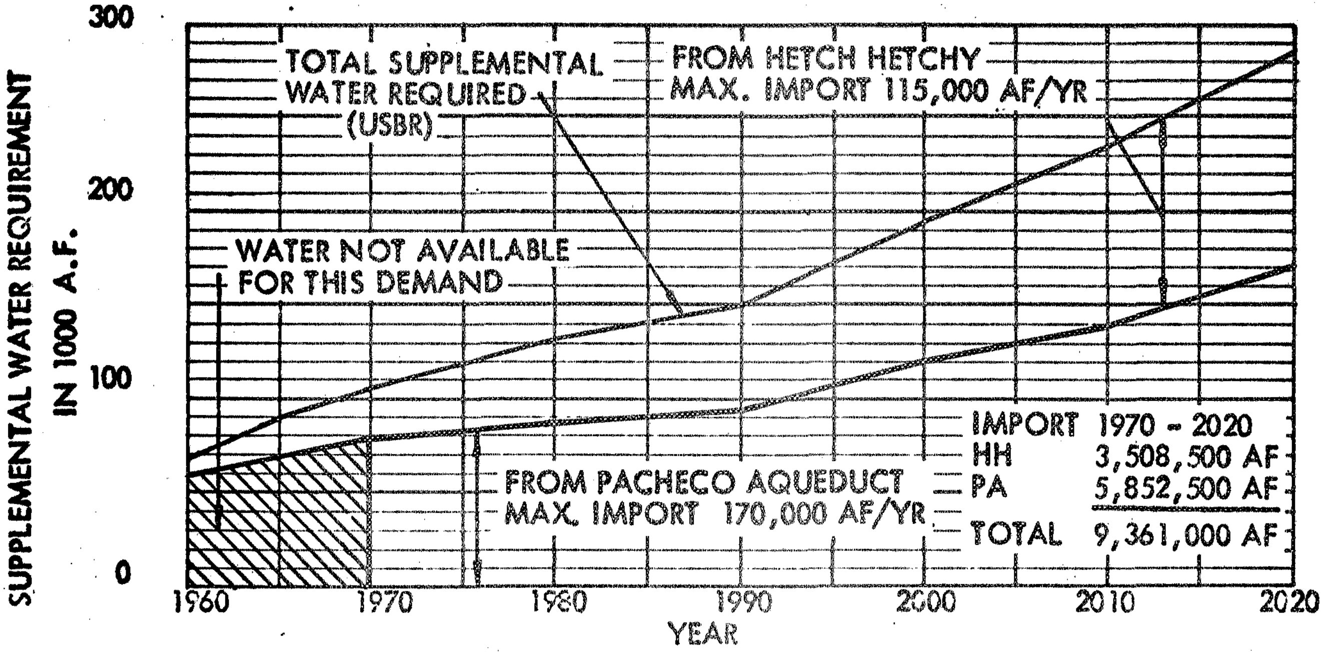

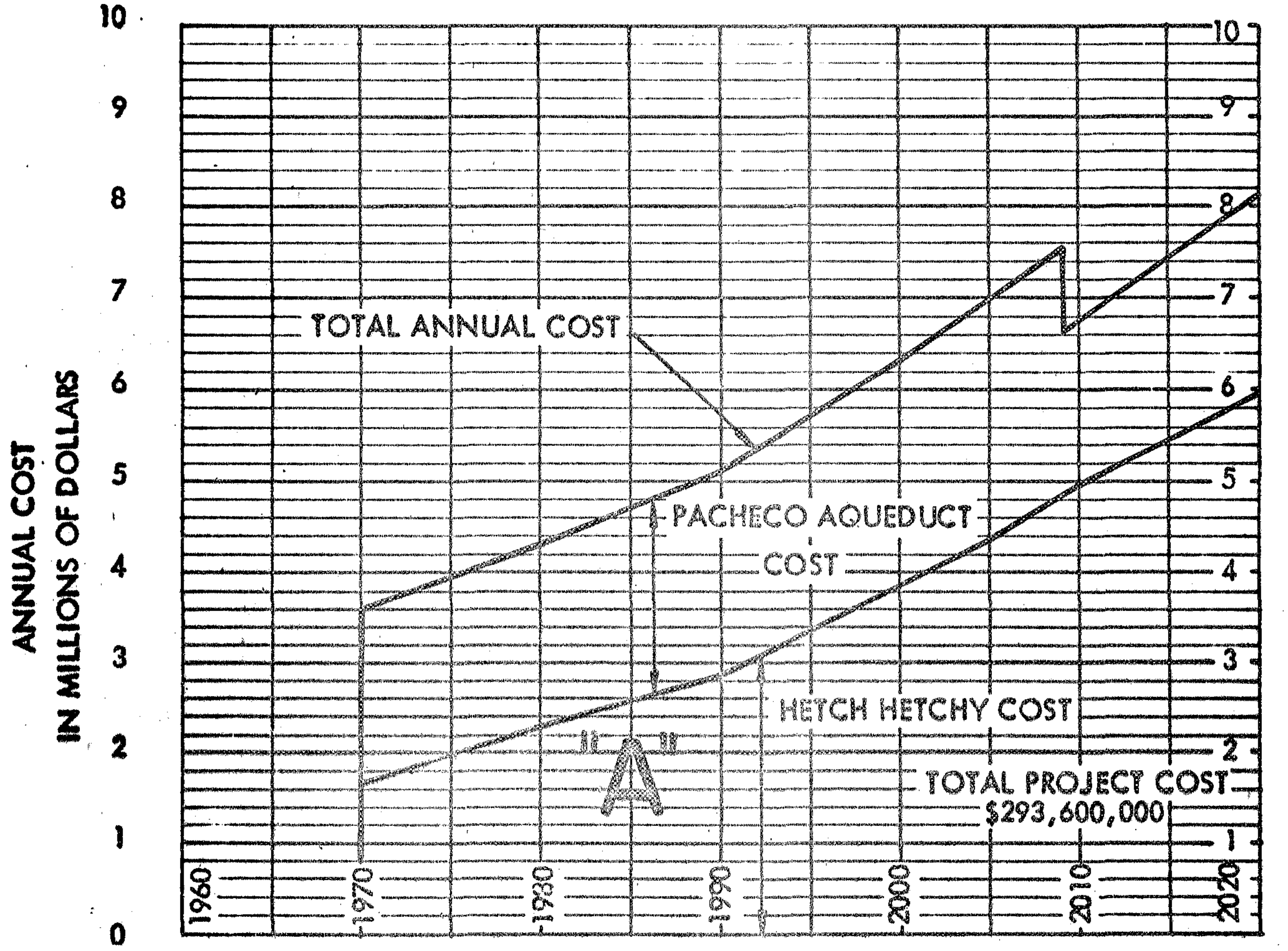

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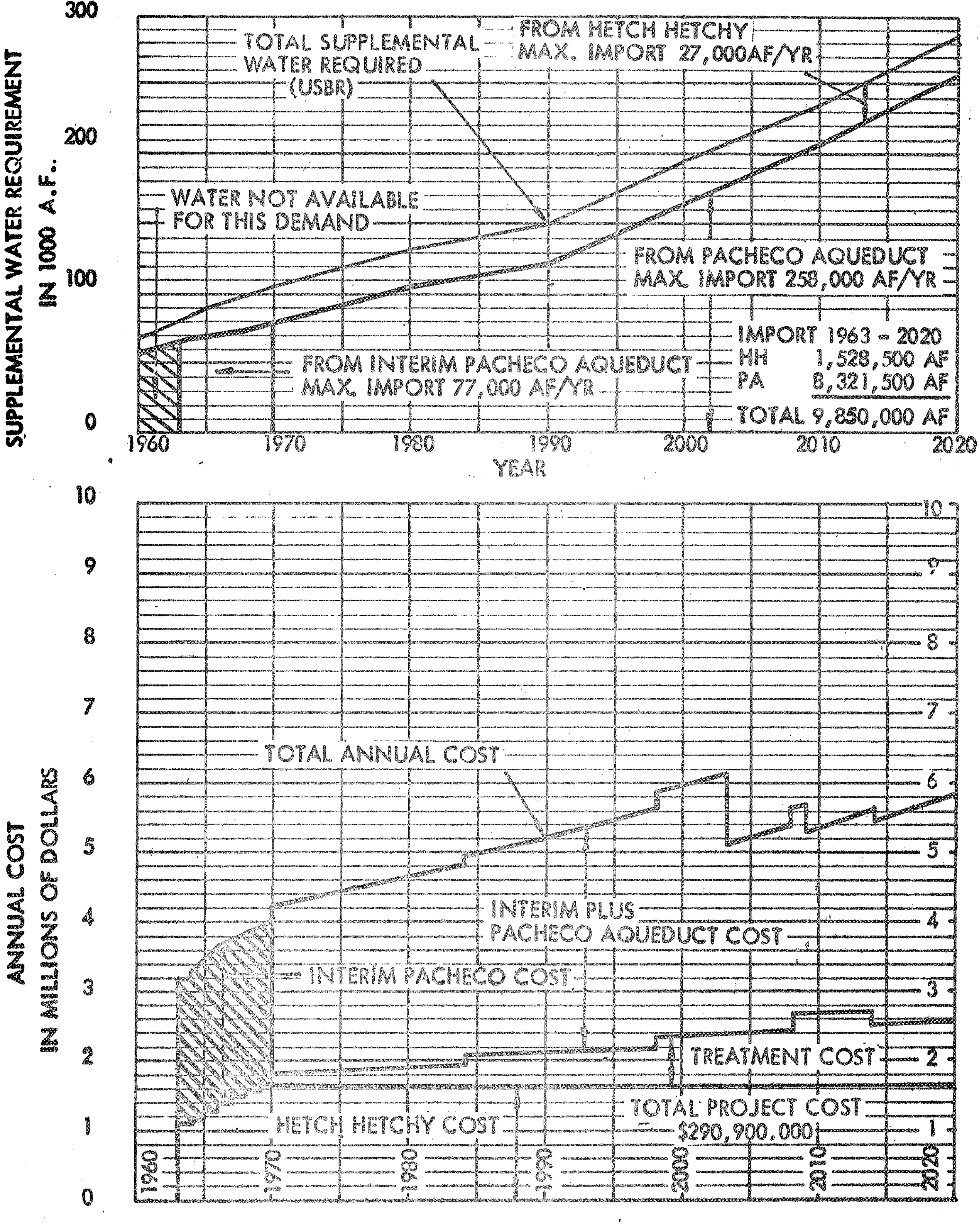

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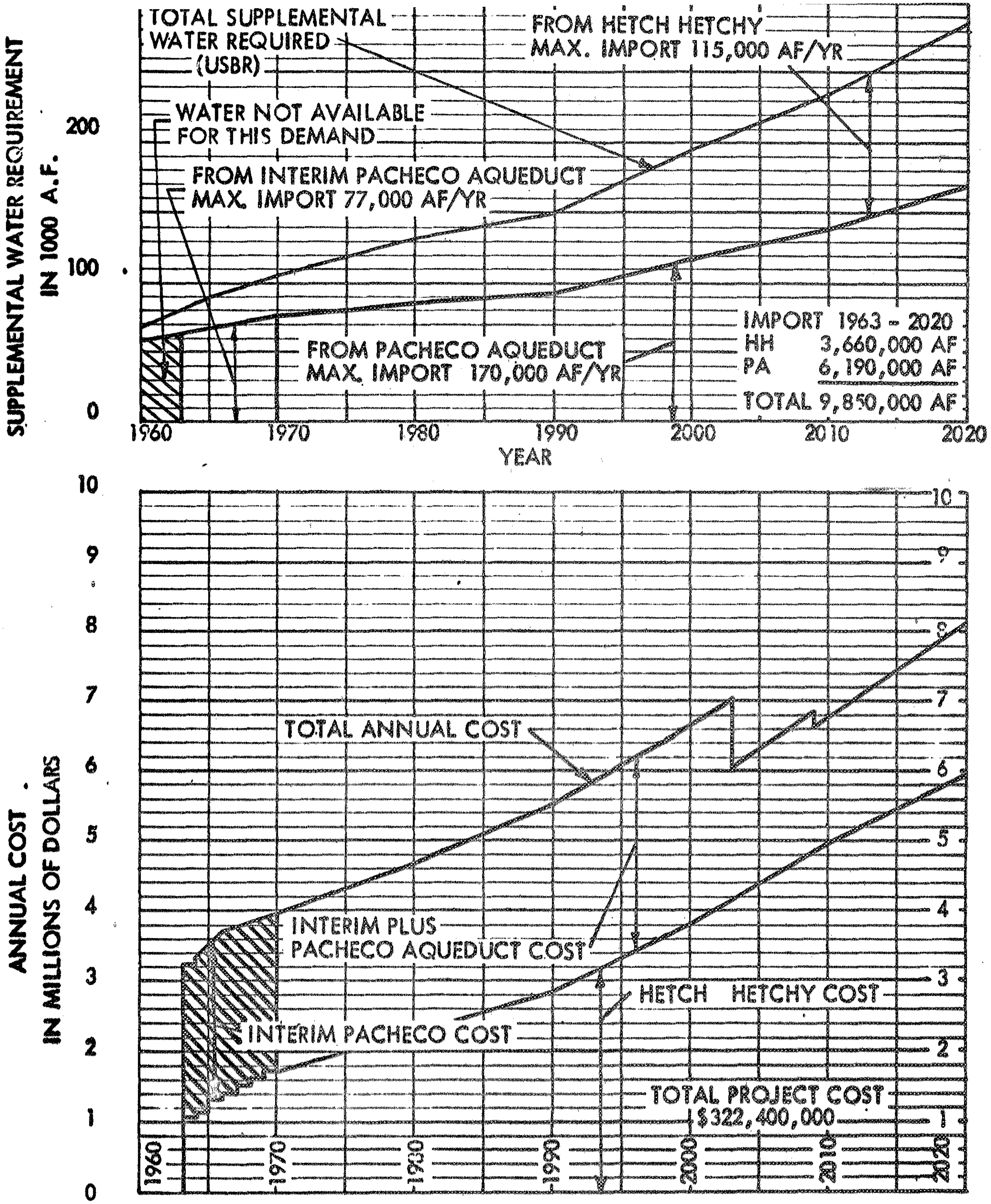

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AND 115,000 AF/YR MAXIMUM FROM HETCH HETCHY

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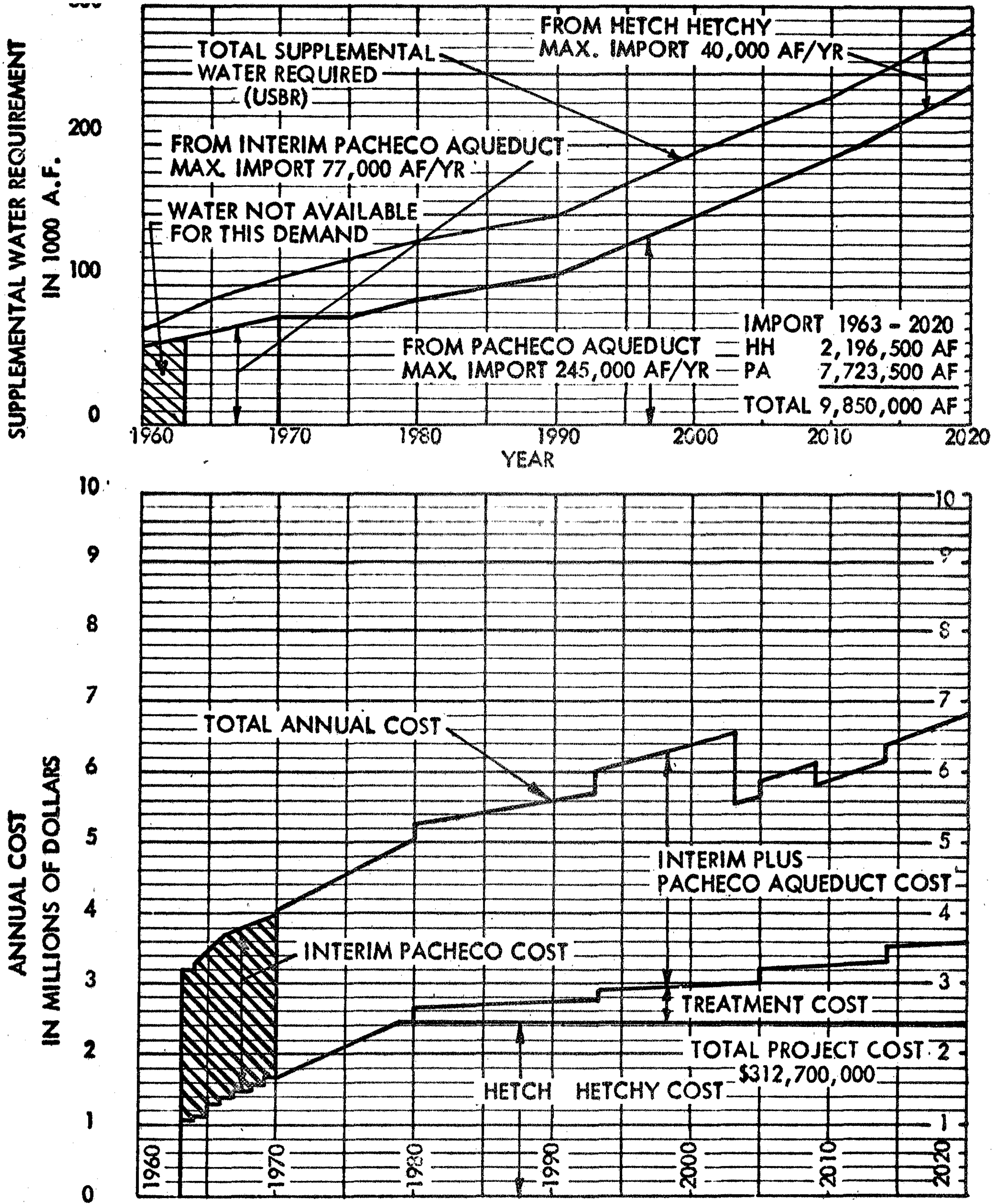

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INTERIM PACHECO AQUEDUCT, PACHECO AQUEDUCT
AND 40,000 AF/YR MAXIMUM FROM HETCH HETCHY

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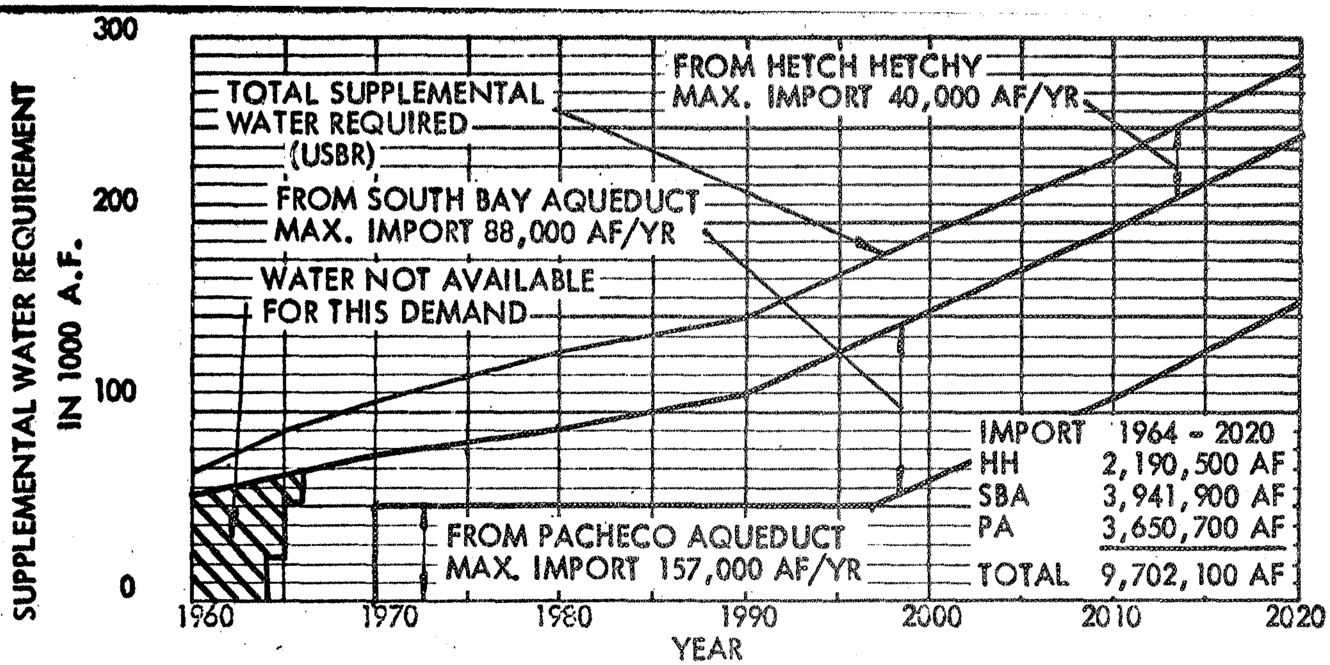

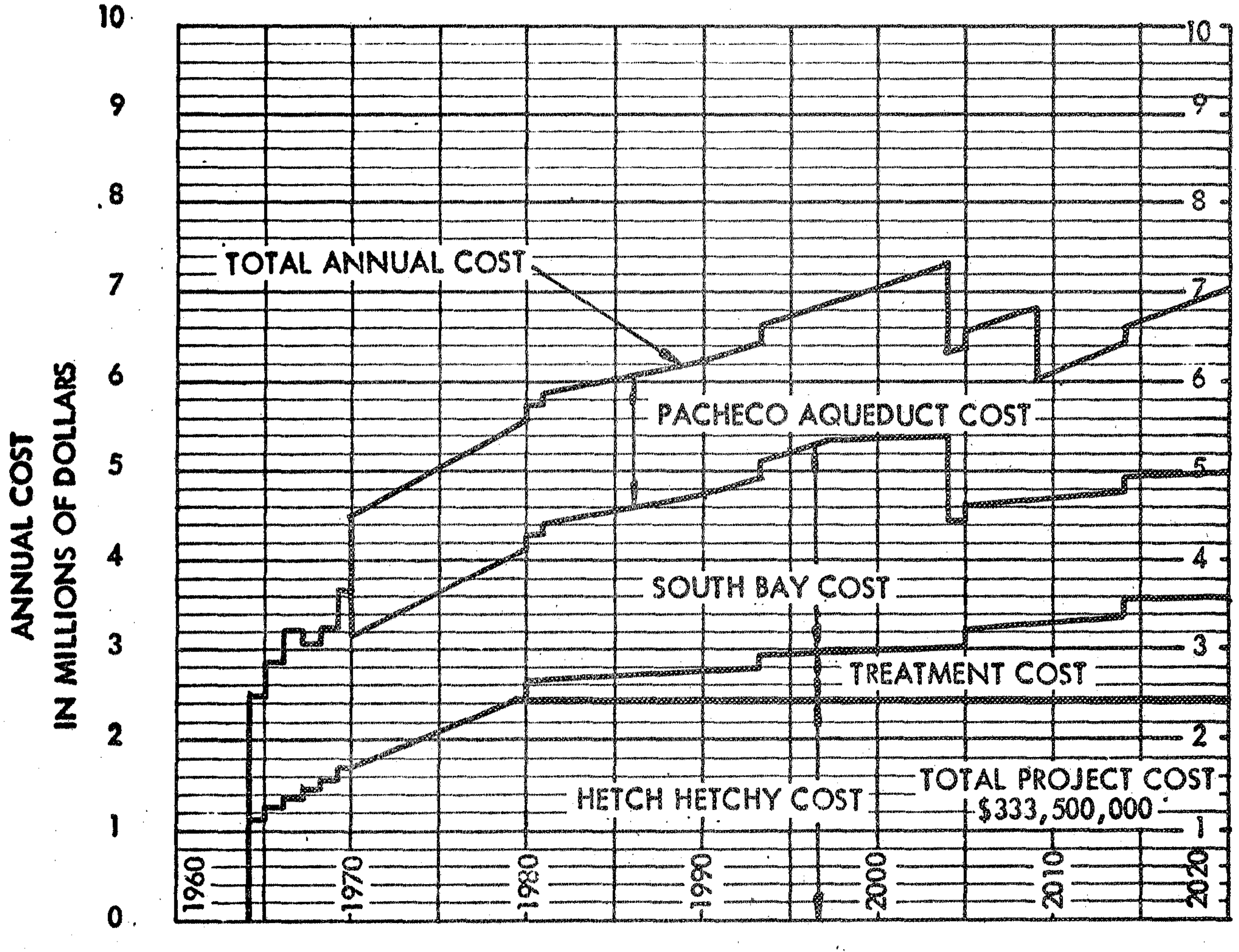

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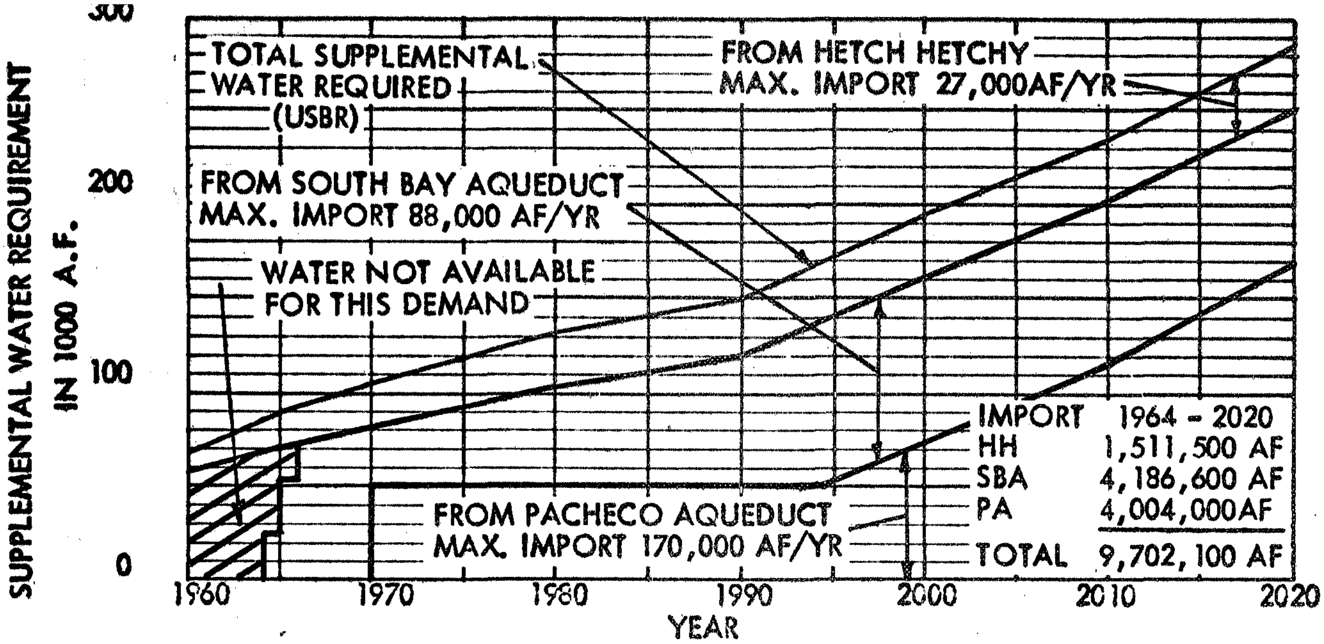
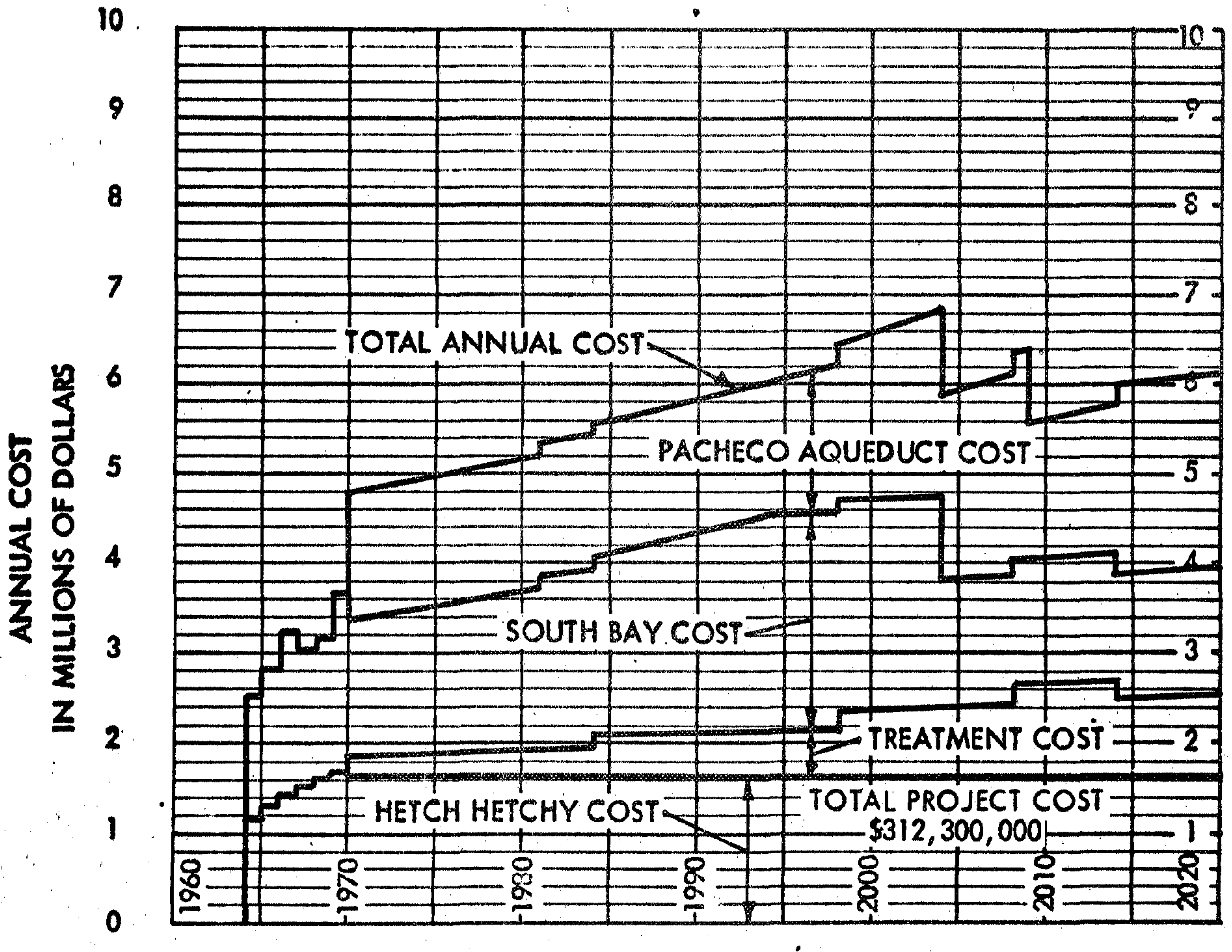
ANNUAL COST	CHECKED BY: JMS	SCALE: None
SOUTH BAY AQUEDUCT, PACHECO AQUEDUCT AND 40,000 AF/YR MAXIMUM FROM HETCH HETCHY	APPROVED BY: PJC	JOB NO.: 61-41
	SHEET ① OF 1	
CREEGAN AND D'ANGELO CIVIL ENGINEERS 1046 POLHEMUS STREET, SAN JOSE, CALIFORNIA SARATOGA, CALIFORNIA	DRAWING NO. A 61-41-17	REV. NO. 0





SANTA CLARA-ALAMEDA-SAN BENITO WATER AUTHORITY

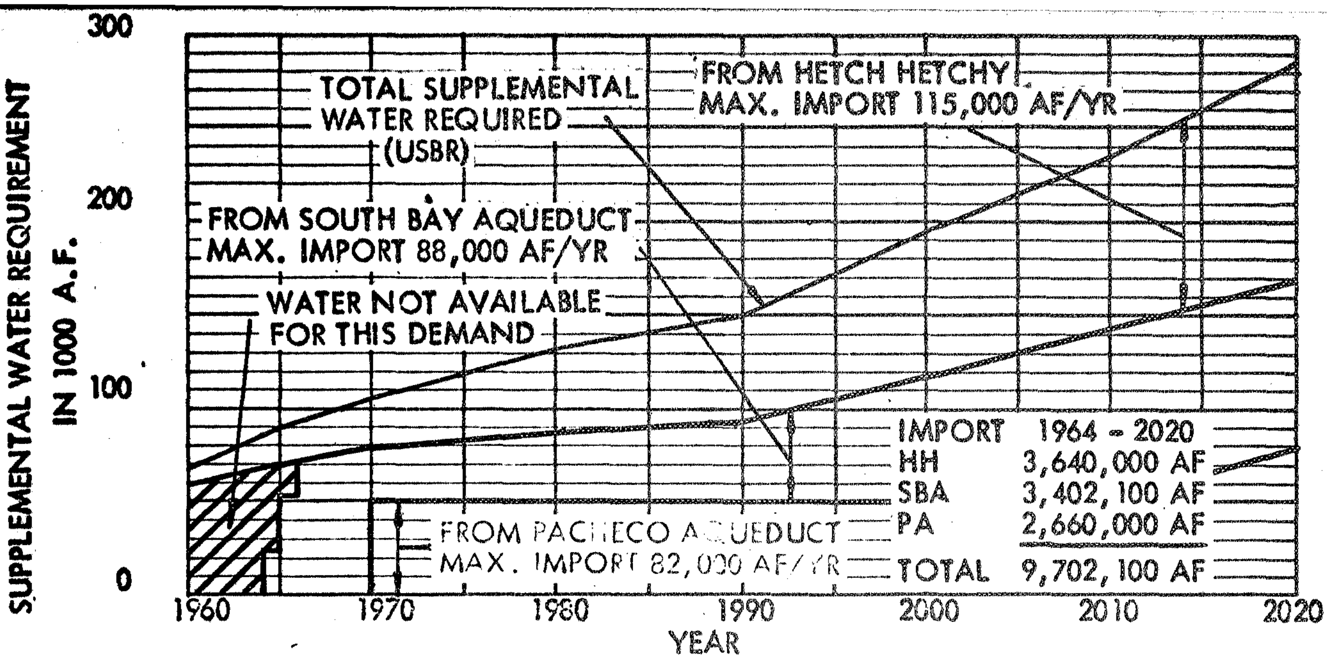
ANNUAL COST

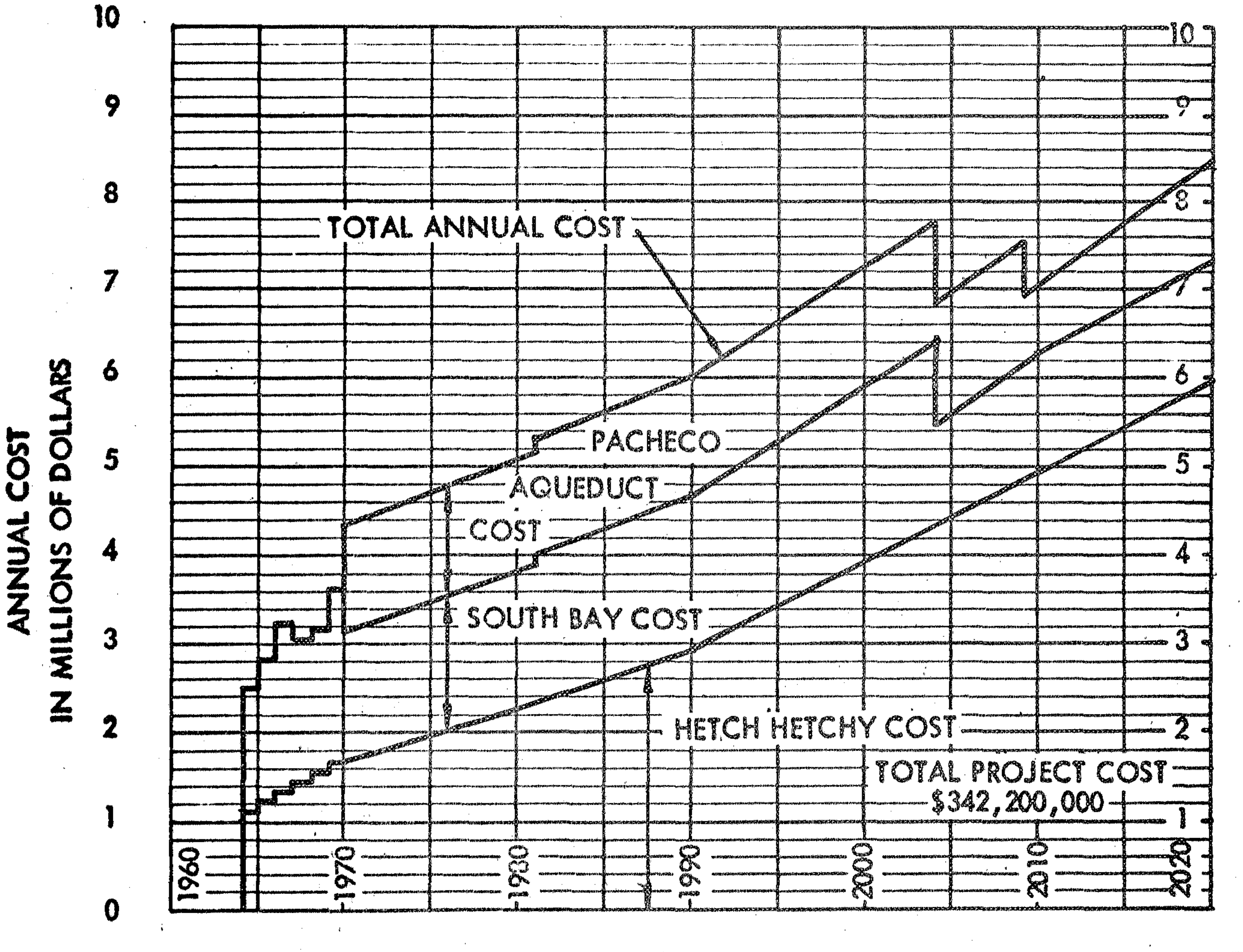
SOUTH BAY AQUEDUCT, PACHECO AQUEDUCT
AND 27,000 AF/YR MAXIMUM FROM HETCH HETCHY

DRAWN BY: RMD	DATE: 10-9-61
CHECKED BY: JMS	SCALE: None
APPROVED BY: PJC	JOB NO.: 61-41
SHEET ① OF 1	
DRAWING NO. A 61-41- 16	REV. NO. 0

CREEGAN AND D'ANGELO
CIVIL ENGINEERS

1046 POLHEMUS STREET, SAN JOSE, CALIFORNIA
SARATOGA, CALIFORNIA





SANTA CLARA-ALAMEDA-SAN BENITO WATER AUTHORITY

ANNUAL COST

SOUTH BAY AQUEDUCT, PACHECO AQUEDUCT AND 115,000 AF/YR MAXIMUM FROM HETCH HETCHY

DRAWN BY: RMD	DATE: 10-9-61
CHECKED BY: JMS	SCALE: None
APPROVED BY: PJC	JOB NO.: 61-41

SHEET ① OF 1

DRAWING NO.		REV. NO.
A	61-41-18	0

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CIVIL ENGINEERS
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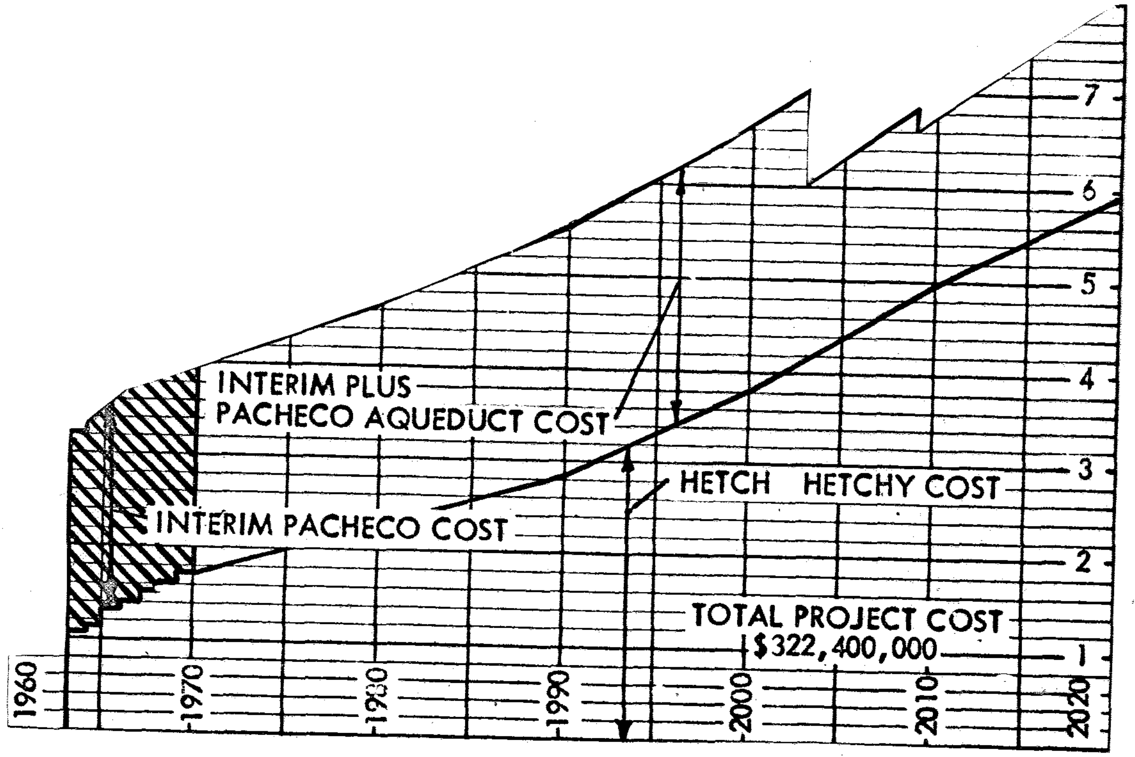
SARATOGA, CALIFORNIA


INTERIM PLUS
PACHECO AQUEDUCT COST
HETCH HETCHY COST
INTERIM PACHECO COST
TOTAL PROJECT COST
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1
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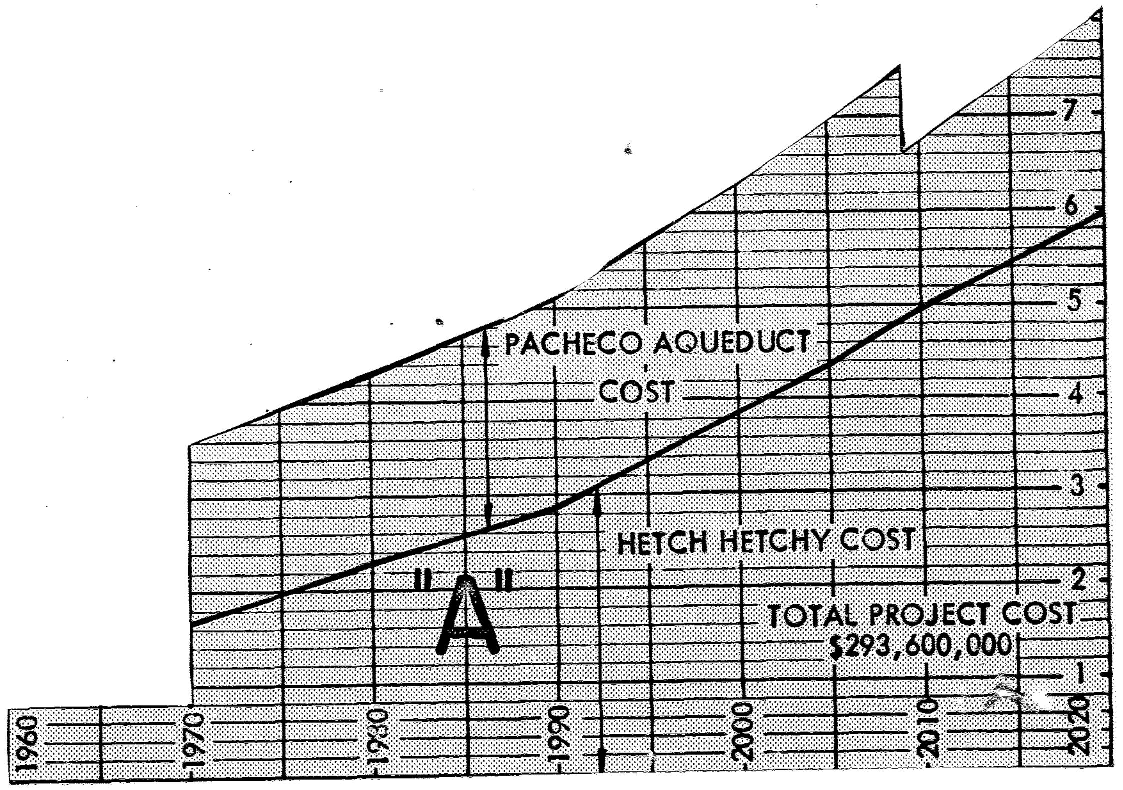
1960
1970
1980
1990
2000
2010
2020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PACHECO AQUEDUCT
COST
HETCH HETCHY COST
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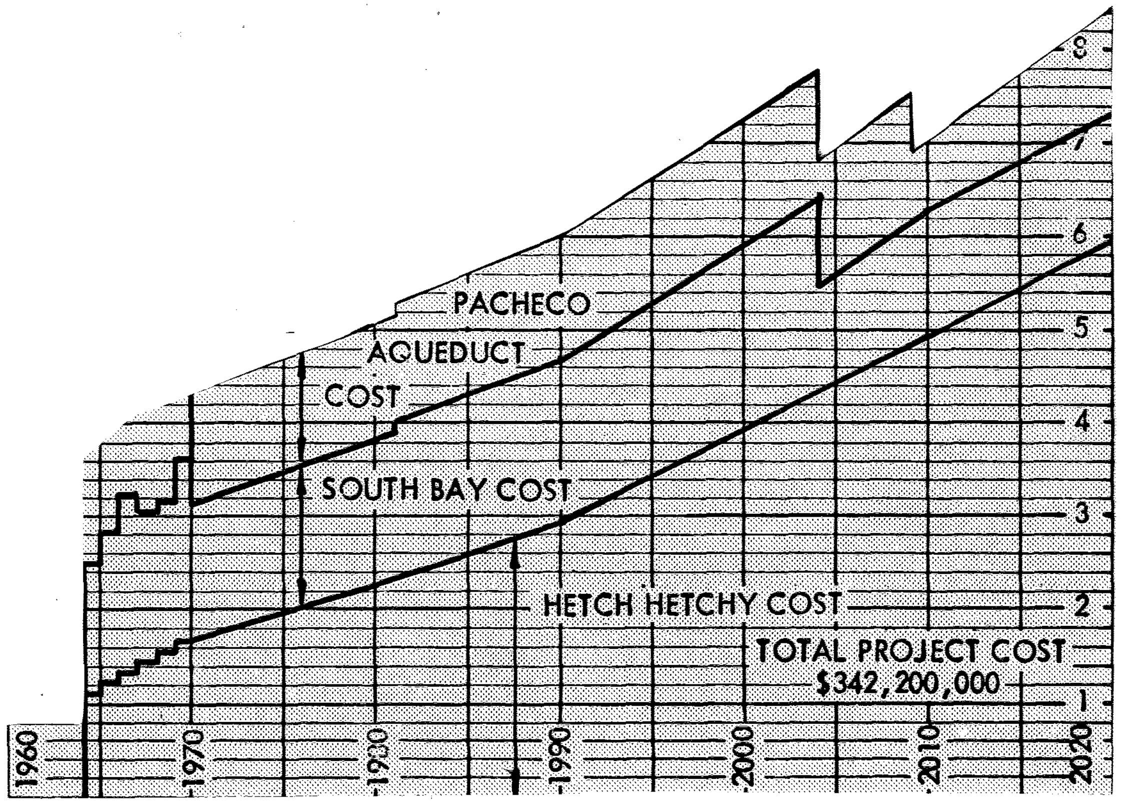
1960
1970
1980
1990
2000
2010
2020


PACHECO
AQUEDUCT
COST
SOUTH BAY COST
HETCH HETCHY COST
TOTAL PROJECT COST
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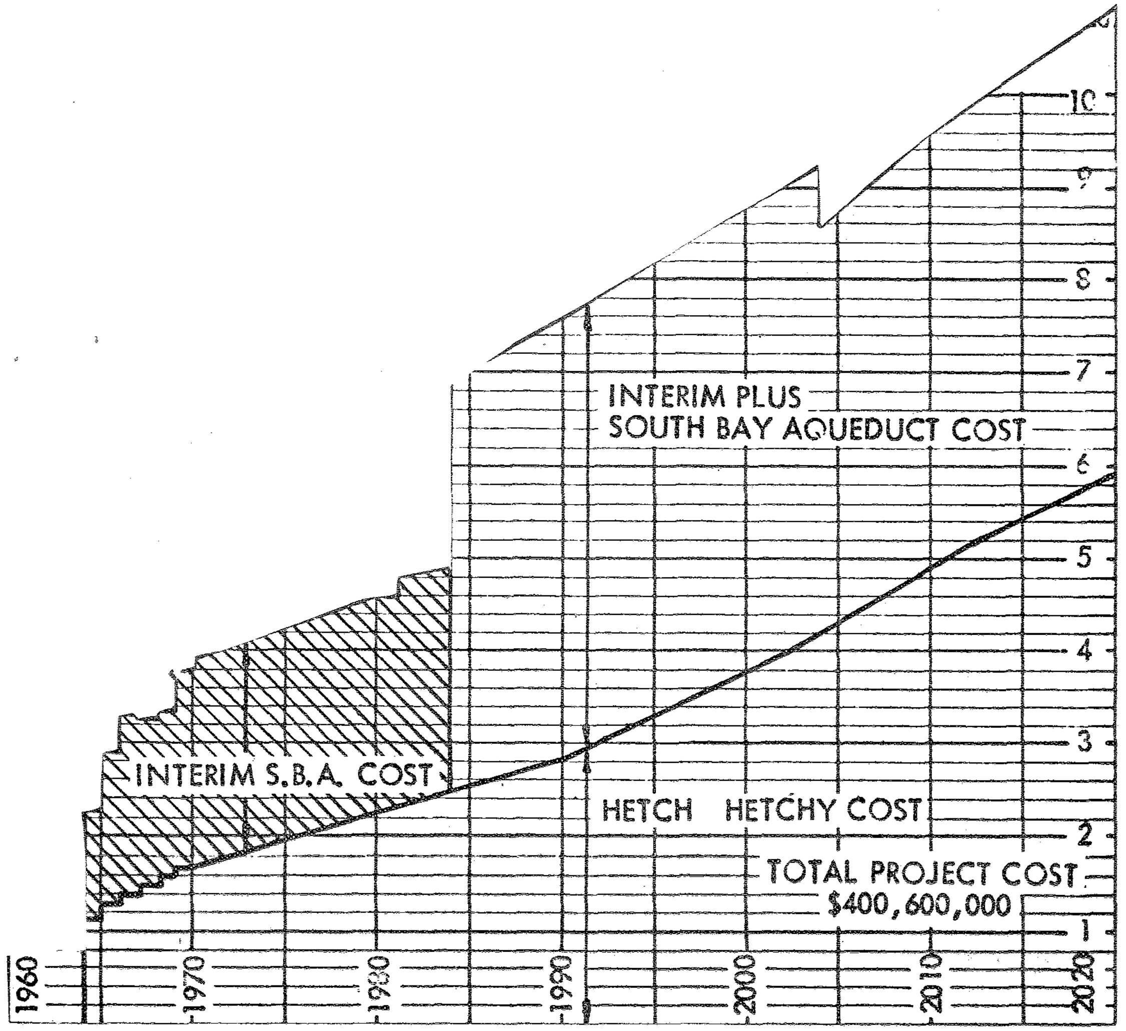
1960
1970
1980
1990
2000
2010
2020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SOUTH BAY AQUEDUCT COST
INTERIM S.B.A. COST
HETCH HETCHY COST
TOTAL PROJECT COST
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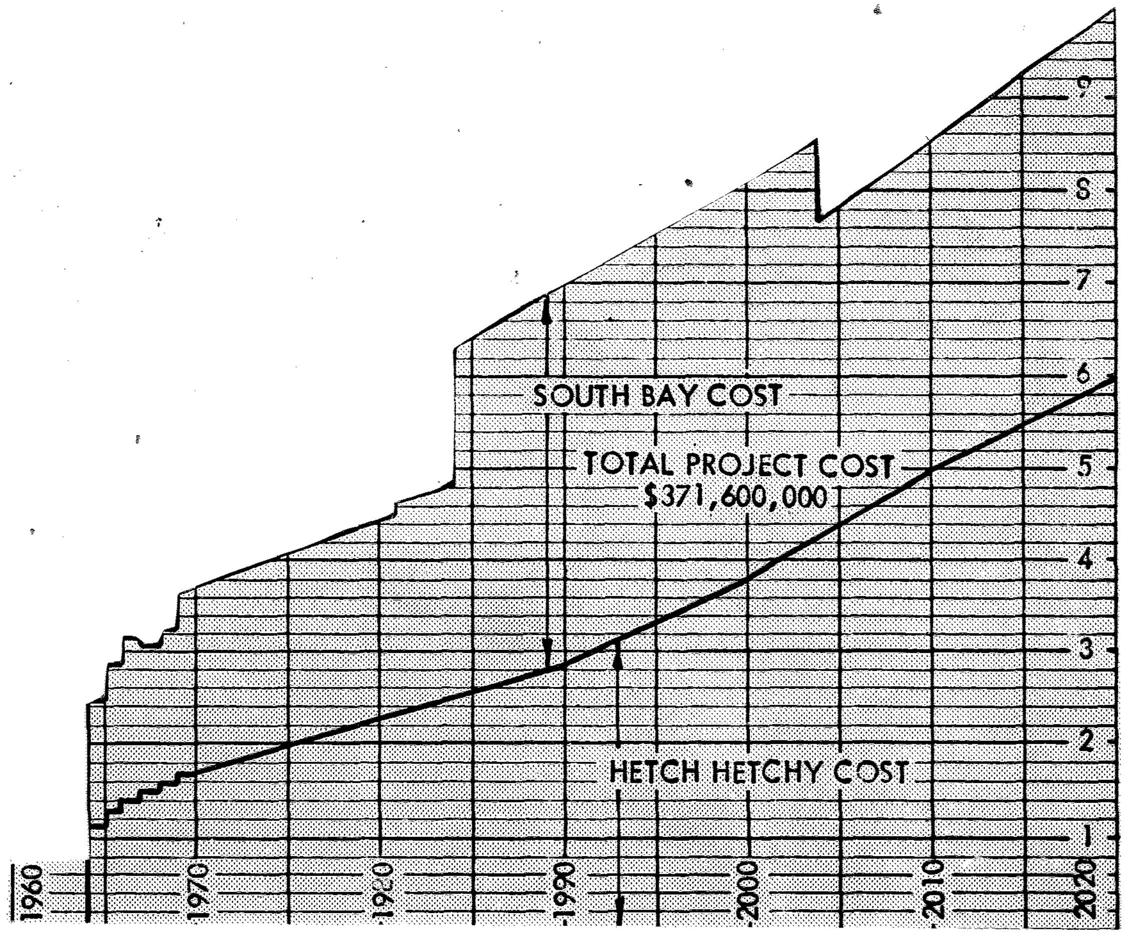
2020


SOUTH BAY COST
TOTAL PROJECT COST
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HETCH HETCHY COST
1
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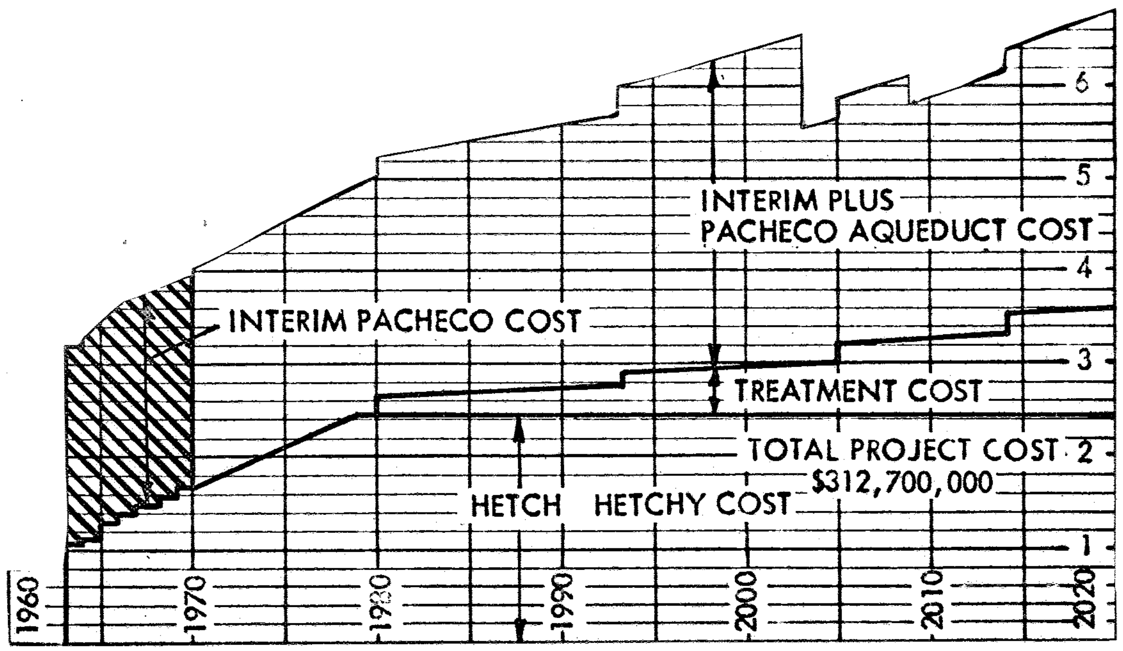
1970
1980
1990
2000
2010
2020


INTERIM PLUS
PACHECO AQUEDUCT COST
INTERIM PACHECO COST
TREATMENT COST
TOTAL PROJECT COST
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HETCH HETCHY COST
1
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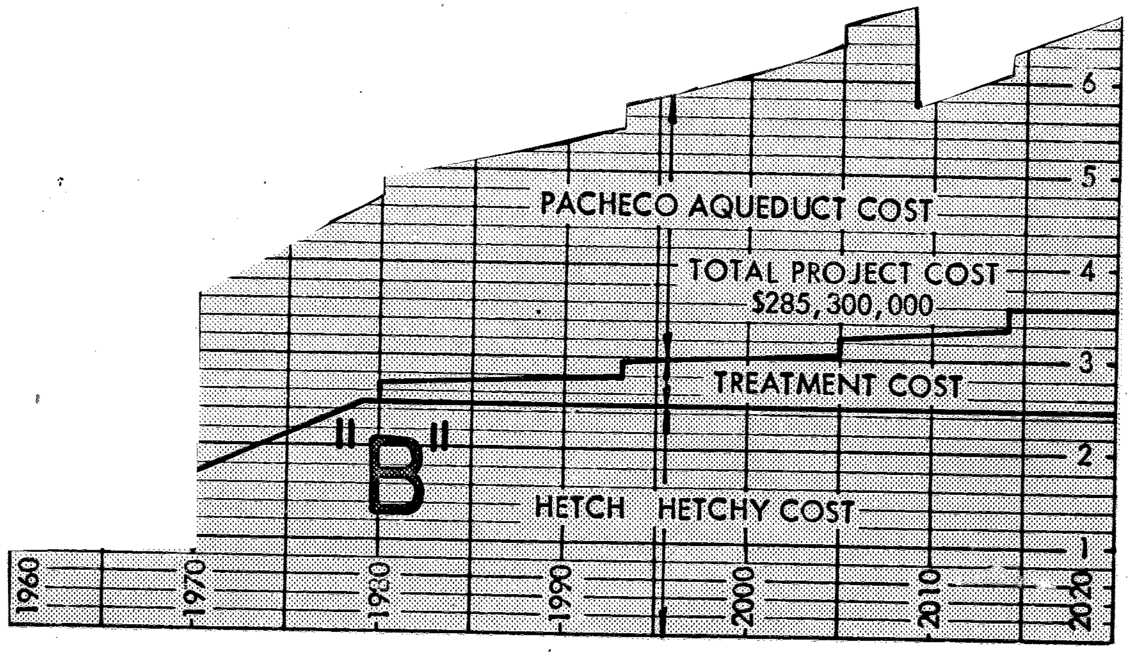
1960
1970
1980
1990
2000
2010
2020


"B"
PACHECO AQUEDUCT COST
TOTAL PROJECT COST
$285,300,000
TREATMENT COST
HETCH HETCHY COST
1
2
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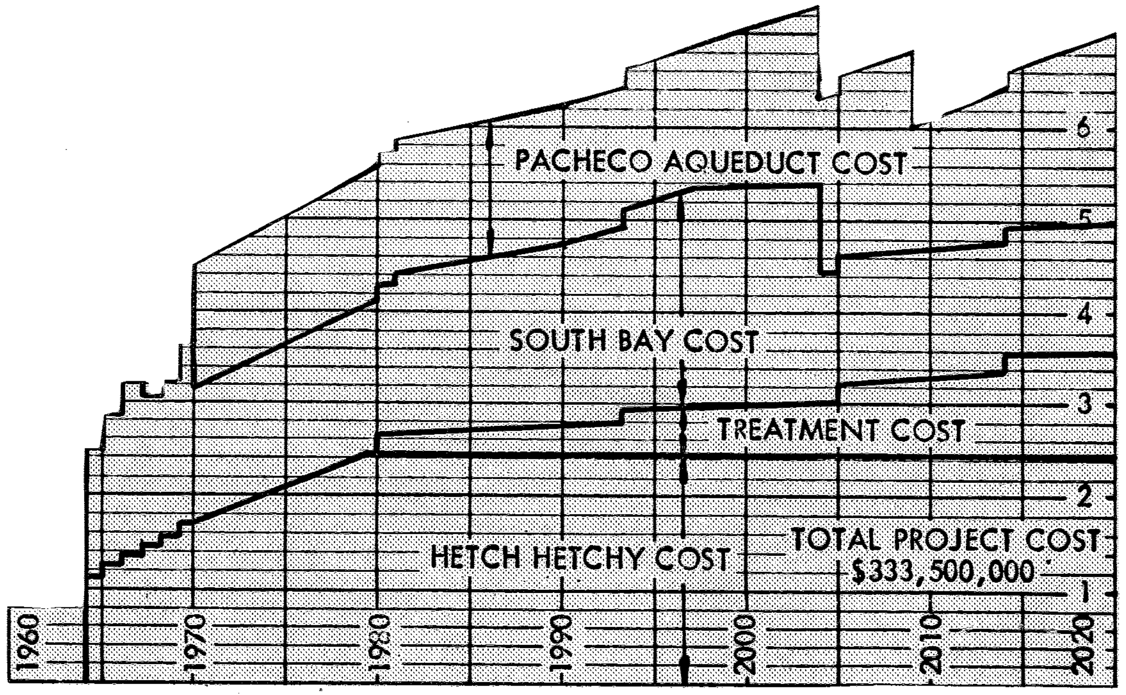
6
1960
1970
1980
1990
2000
2010
2020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SOUTH BAY COST
TREATMENT COST
HETCH HETCHY COST
TOTAL PROJECT COST
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1960
1970
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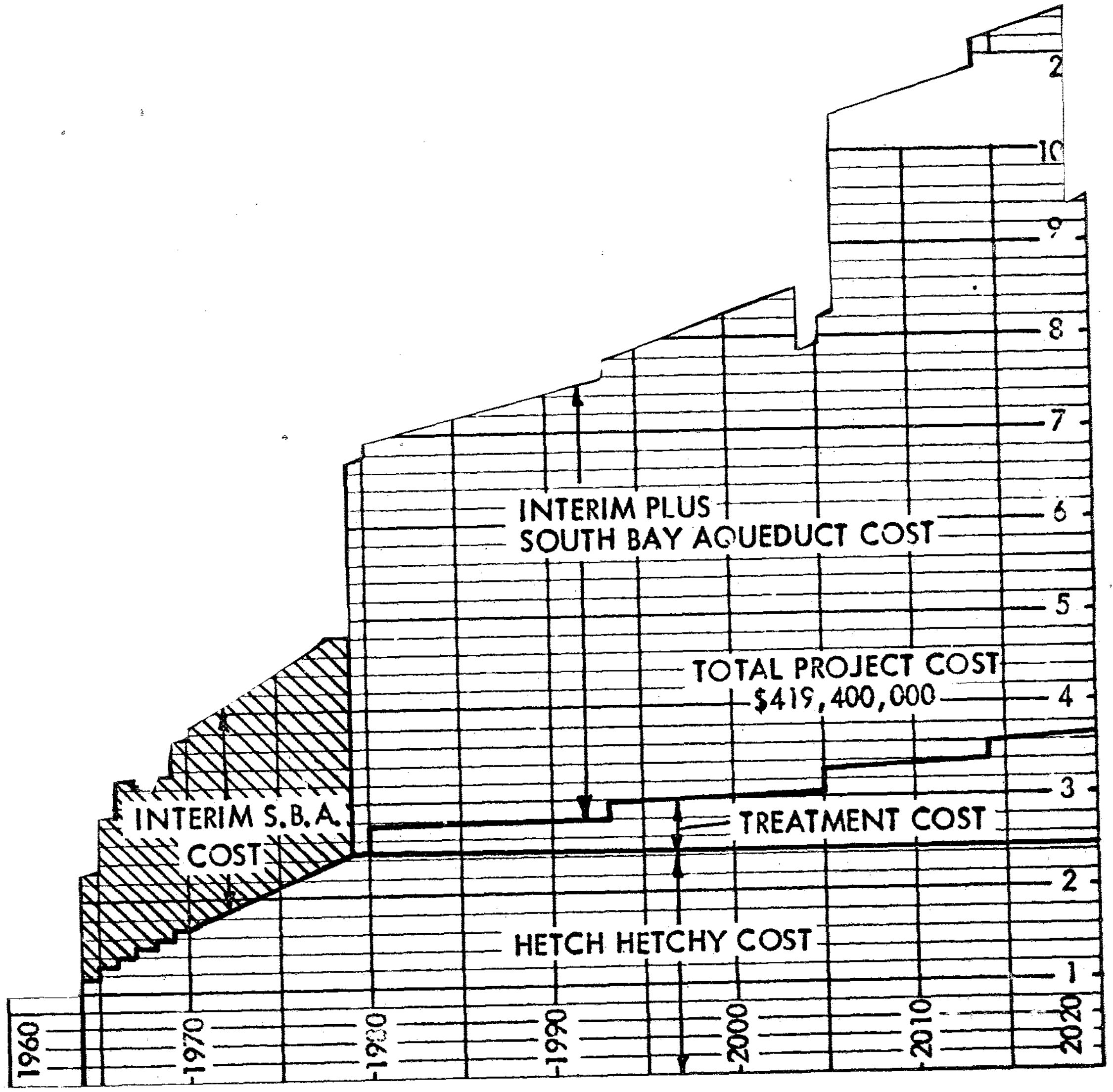
1990
2000
2010
2020


INTERIM PLUS
SOUTH BAY AQUEDUCT COST
TOTAL PROJECT COST
$419,400,000
INTERIM S.B.A.
COST
TREATMENT COST
HETCH HETCHY COST
1960
1970
1980
1990
2000
2010
2020
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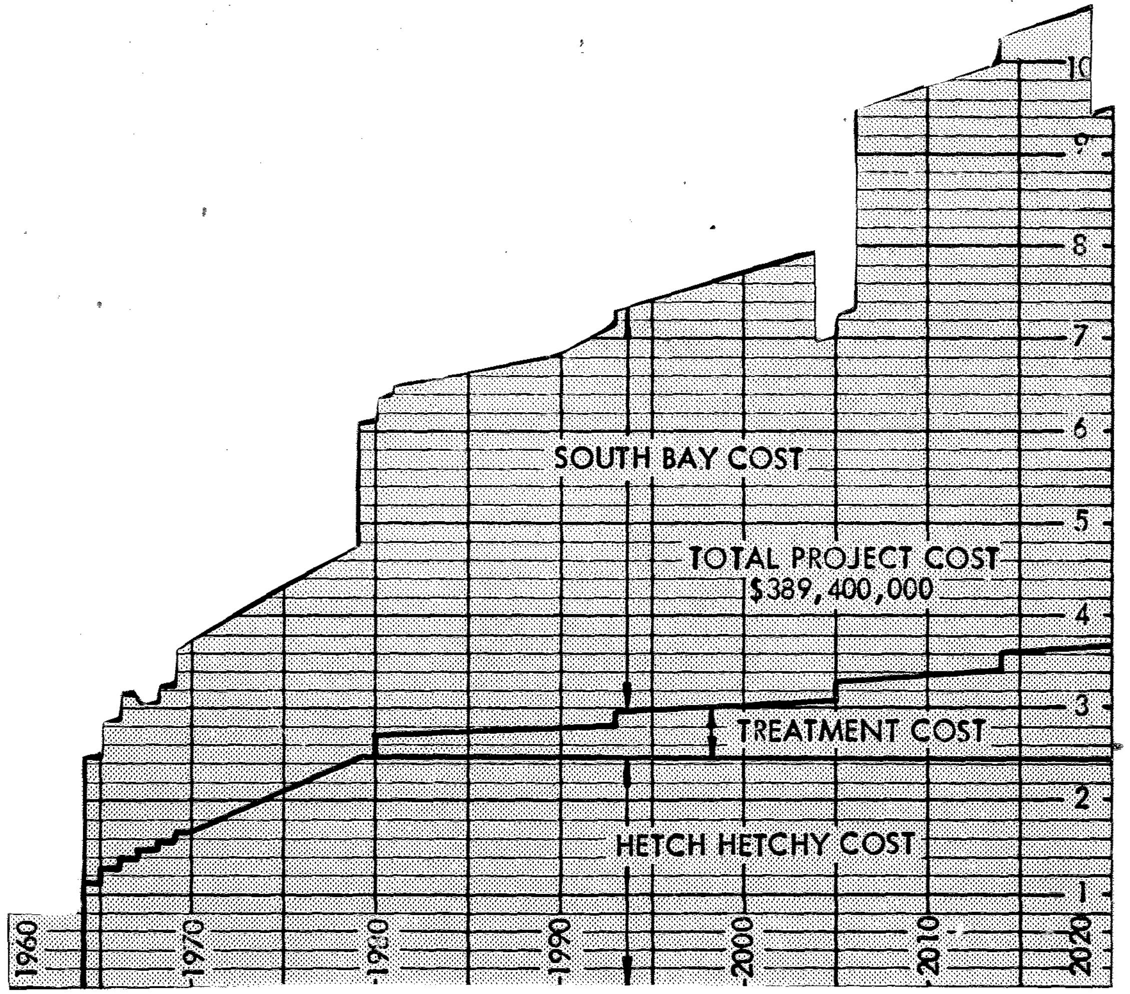
SOUTH BAY COST
TOTAL PROJECT COST
$389,400,000
TREATMENT COST
HETCH HETCHY COST
1960
1970
1980
1990
2000
2010
2020
1
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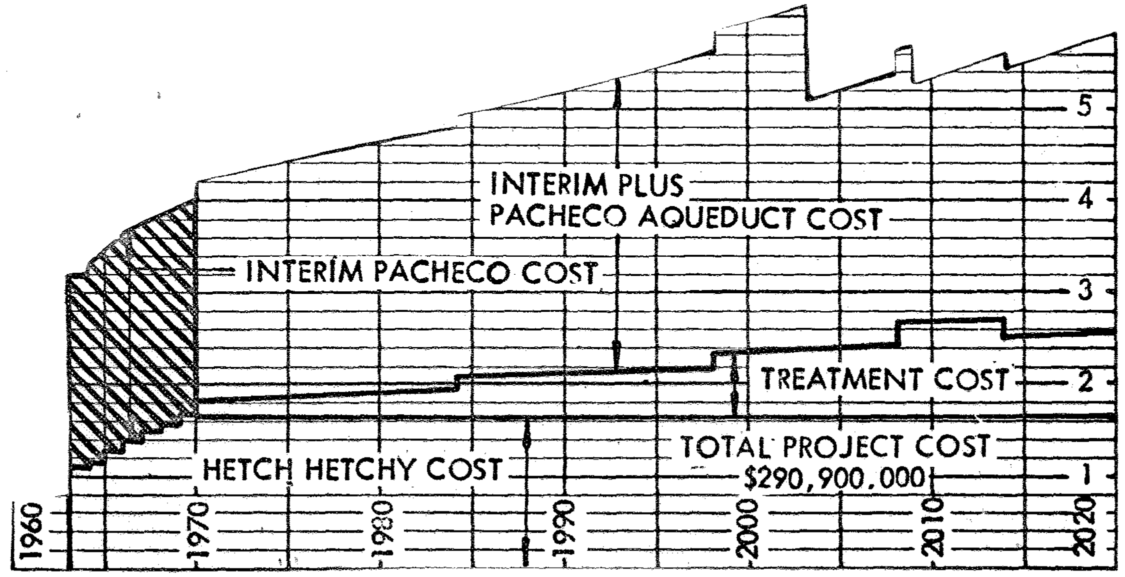
INTERIM PLUS
PACHECO AQUEDUCT COST
INTERIM PACHECO COST
TREATMENT COST
TOTAL PROJECT COST
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HETCH HETCHY COST
5
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1970
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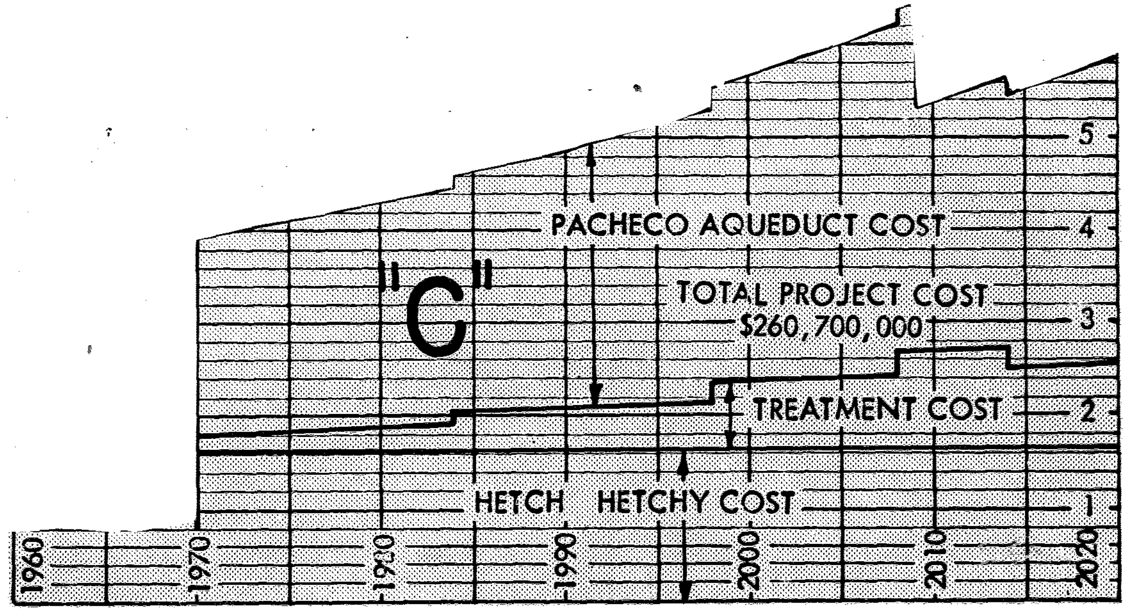
1990
2000
2010
2020


"C"
PACHECO AQUEDUCT COST
TOTAL PROJECT COST
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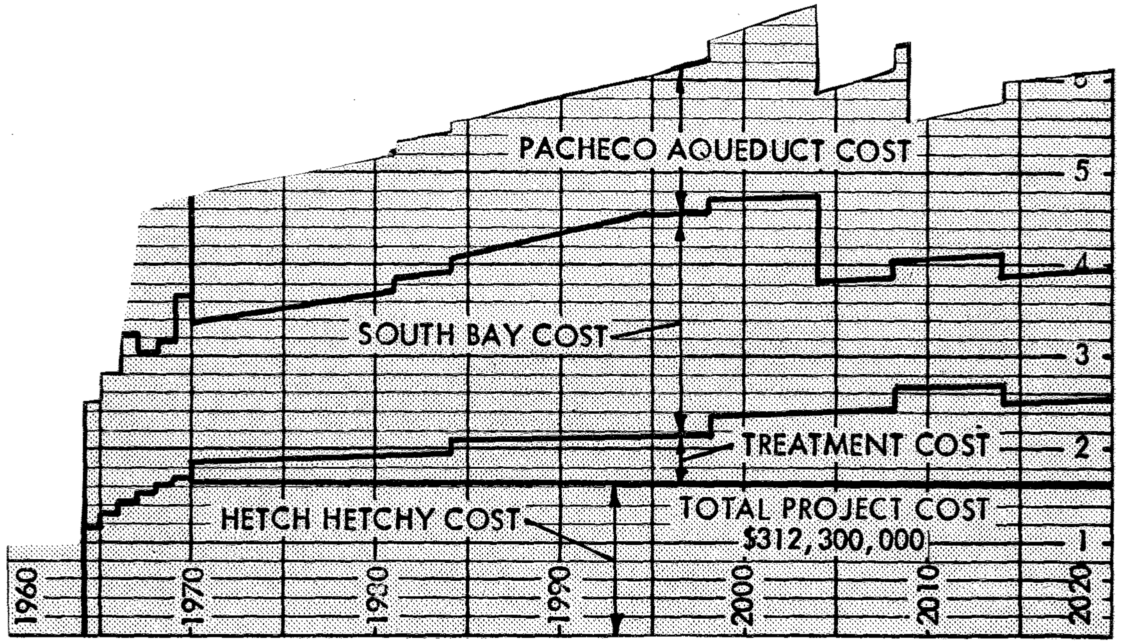
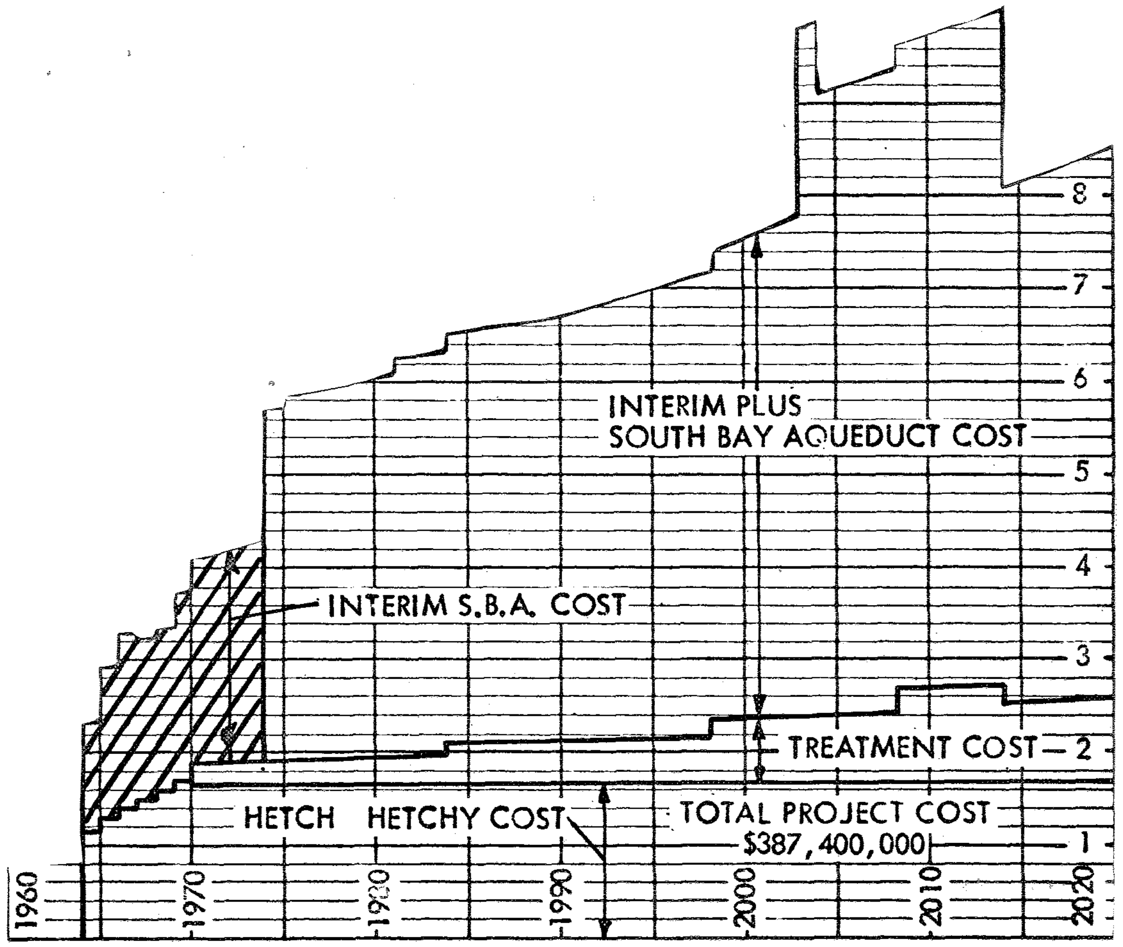
TREATMENT COST
HETCH HETCHY COST
5
4
3
2
1
1960
1970
1980
1990
2000
2010
2020


PACHECO AQUEDUCT COST
SOUTH BAY COST
TREATMENT COST
HETCH HETCHY COST
TOTAL PROJECT COST
$312,300,000
5
4
3
2
1
1960
1970
1980
1990
2000
2010
2020


INTERIM PLUS
SOUTH BAY AQUEDUCT COST
INTERIM S.B.A. COST
TREATMENT COST
HETCH HETCHY COST
TOTAL PROJECT COST
$387,400,000
1
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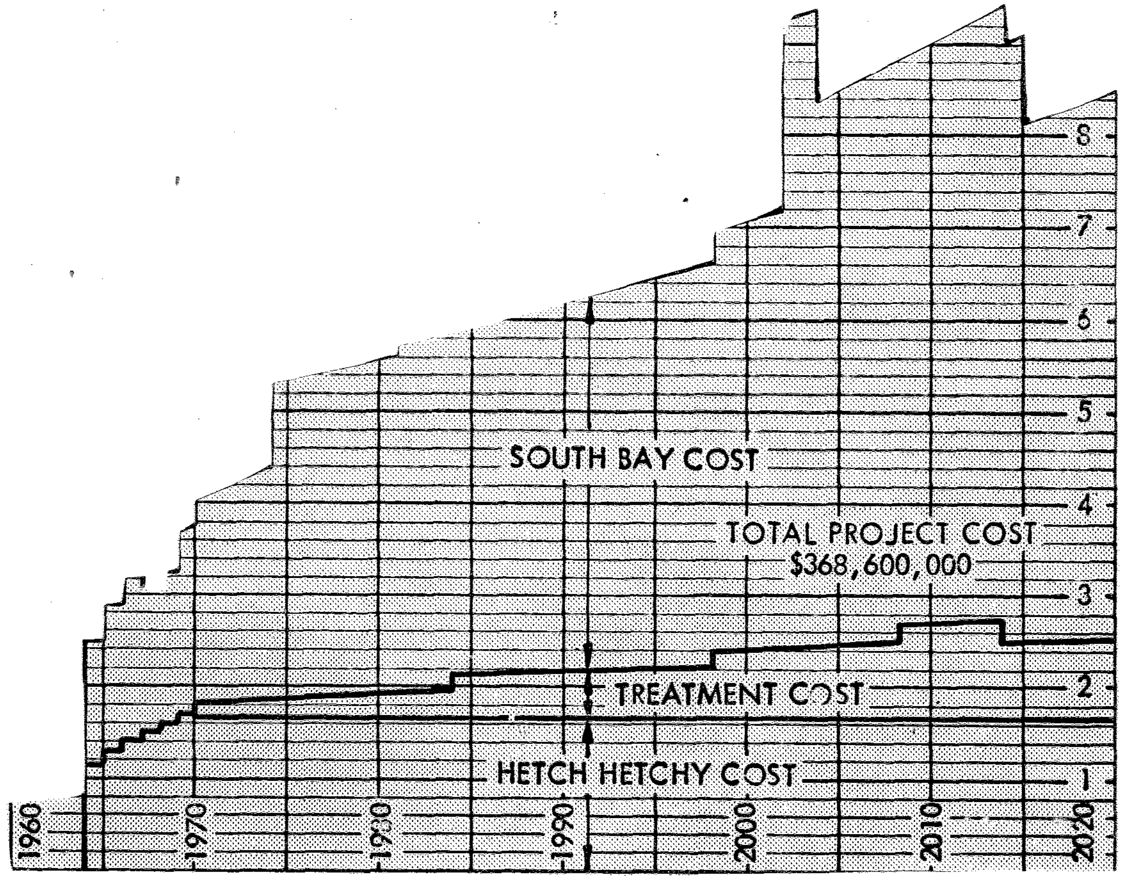
1960
1970
1980
1990
2000
2010
2020


SOUTH BAY COST
TOTAL PROJECT COST
$368,600,000
TREATMENT COST
HETCH HETCHY COST
1
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1960
1970
1980
1990
2000
2010
2020

INSTRUCTIONS IN THE USE OF THE CUTOUT PACKETS

Observe that the cost curves have been cut out and assembled in three packets, labeled A, B, and C. The 'A' packet compares the five alternate projects on the basis of the Hetch Hetchy service being permitted to expand to 115,000 acre feet per year, which is the City of San Francisco projection for the year 2020. The 'B' packet compares the five alternate projects on the basis of the Hetch Hetchy being permitted to expand to 40,000 acre feet per year, which is the City of San Francisco projection for the year 1980. The 'C' packet compares the five alternate projects on the basis of the Hetch Hetchy service being permitted to expand to 27,000 acre feet per year, which is the City of San Francisco projection for the year 1970.

In each packet is a white, green, pink, yellow, and blue cutout. These cutouts are for the following projects, respectively:

White:	Interim South Bay Aqueduct, plus South Bay Aqueduct.
Green:	South Bay Aqueduct exclusively.
Pink:	South Bay Aqueduct in 1964, plus Pacheco Aqueduct (Federal Project) in 1970.
Yellow:	Interim Pacheco Project in 1963, converted to completed Federal Project in 1970.
Blue:	Federal Project alone, starting in 1970.

It will be noticed in observing packets 'A', 'B', and 'C' that the white project is the worst from the standpoint of costs in all cases. For this reason you are invited to fold the white sheet down in each packet and no longer consider it.

It will be noticed that in each of the three packets, the blue sheet shows the best project from the standpoint of total cost. You are invited to fold down this sheet also, however, because it is not practical in that it does not furnish water until 1970.

Three sheets remain; the green, the pink, and the yellow, and the analysis begins to come into focus. Consider in each packet the standing of the green project. Of the three projects remaining under consideration, this is the least desirable from the standpoint of cost. It is also undesirable from the standpoint of function because it neither provides service to South County, nor to our southern neighbors and fellow members of the Tri County Water Authority. For these reasons you are invited to fold down the green sheet and exclude it from further consideration.

The two projects which then remain for consideration are the pink and the yellow. These are the two projects which have recently been the focus of principal concern. It will be observed that in all cases the yellow project is superior to the pink on the basis of total project costs alone. This is not the full story, however, and you are referred next to the Cost Comparison Sheet.

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COUNTY FLOOD CONTROL AND
WATER DISTRICT
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CONSIDERING THE COST COMPARISON SHEET

On the Cost Comparison Sheet, all five projects are shown for each respective schedule of importation from Hetch Hetchy. The white, green and blue projects have been shaded out since these are not considered further. Your attention is directed to the figures relating to the pink and the yellow projects.

The top table on the Cost Comparison Sheet shows the total cost of the projects to the year 2020. It will be noted in each of these that the Interim plus Pacheco (yellow project) is less than the combination South Bay Aqueduct – Federal Pacheco, by an amount approximating $20 to $21 million. This amount, incidentally, is roughly equal to the cost of the South Bay Aqueduct Project, without interest. It should be realized that in preparing the cost curves for the yellow project, the cost of water at the Delta Mendota Canal is taken at today's costs. The Bureau of Reclamation has indicated these costs will prevail until 1966, but has not ventured to propose what they will be after the completion of the San Luis Project. It is anticipated that they may go up from between $1.00 and $3.00. Such a rise in the purchase price of the water will materially decrease the difference between the respective yellow and red projects. The yellow curves also anticipate the exclusive use of Federal power. It is anticipated that between 1963 and 1970 for at least part of the time power must be drawn from the PG & E. Were PG & E rates to maintain until 1970 the differential between the yellow and the pink projects would reduce by almost $5 million. It will also be observed that even with the reductions in the differential between projects, the pink project for the 27,000 acre foot Hetch Hetchy schedule is roughly equal to the yellow project under the 40,000 acre foot schedule and is superior to the yellow project under the 115,000 acre foot schedule.

The center table on the cost comparison sheet shows the total water yield of each of the alternate projects until the year 2020, expressed in millions of acre feet, based on the demand assumptions.

The bottom table shows average cost per acre foot for each of the projects. This table is merely a division of the center table into the top table.

COST COMPARISON SHEET

		Total Project Costs to 2020 A.D. (all figures in millions of dollars)		
		LIMIT OF HETCH-HETCHY SUPPLY		
		115,000 A.F./Yr	40,000 A.F./Yr.	27,000 A.F./Yr
W	Interim SBA + SBA	400.6	419.4	387.4
G	SBA Alone	371.6	389.4	368.6
R	SBA + Pacheco	342.2	333.5	312.3
Y	Interim Pacheco + Pacheco	322.4	312.7	290.9
B	Pacheco Alone	293.6	285.3	260.7

W = White
G = Green
R = Red
Y = Yellow
B = Blue

	Total Project Yields by 2020 A.D. (all figures in millions of A.F.)		
	LIMIT OF HETCH-HETCHY SUPPLY		
	115,000 A.F./Yr	40,000 A.F./Yr	27,000 A.F./Yr
Interim SBA + SBA	9.702	9.702	9.702
SBA Alone	9.702	9.702	9.702
SBA + Pacheco	9.702	9.702	9.702
Interim Pacheco + Pacheco	9.85	9.85	9.85
Pacheco Alone	9.361	9.361	9.361

	$/A.F., Average to 2020 A.D.		
	LIMITS OF HETCH-HETCHY SUPPLY		
	115,000 A.F./Yr	40,000 A.F./Yr.	27,000 A.F./Yr
Interim SBA + SBA	41.30	43.20	39.90
SBA Alone	38.30	40.10	38.00
SBA + Pacheco	35.30	34.40	32.20
Interim Pacheco + Pacheco	32.70	31.75	29.50
Pacheco Alone	31.40	30.50	27.85

NOTE: All costs are for SBA and Pacheco importation to the service area (at Airpoint or Anderson), plus treatment of that water "invading" the Hetch-Hetchy service area. Costs for internal distribution system are not included.

APPENDIX A

Appendix A consists of detailed calculations supporting the cost curves presented in this Report. Any agencies wishing to verify the cost curves will be furnished a copy of Appendix A upon request.

PERTINENT OBSERVATIONS

It can be observed when analyzing these data that:

1. Curtailing the use of Hetch Hetchy to a reasonable expansion of their present service but to an amount less than their ultimate projected service will result in material savings to the service area. These savings, in combination with the saving of "wasted" funds on parts of the Interim Pacheco Project, would permit the construction of two aqueducts instead of one at little or no additional expense.

2. The actual differential between the yellow and the pink projects is at most equal to the cost of the South Bay Aqueduct without interest, and will probably be much less.

3. From the standpoint of sound advance planning, the opportunity is afforded to contract for two sources of imported water at little or no penalty.

These are some of the observations which the Santa Clara Valley Water Conservation District Board made at their meeting of October 10, 1961. That Board's subsequent decision was subject to the successful completion of South Bay Aqueduct negotiations with the State, and other sage reservations. At the meeting before the Water Commission on October 11, 1961, figures were presented, by Don Currlin, which took a different approach to the same problem, but showed essentially the same relationship between projects and led to the same conclusions.

APPENDIX A

COMPARISON OF COST OF IMPORTING WATER
TO
NORTH SANTA CLARA VALLEY
FROM
HETCH HETCHY, SOUTH BAY AQUEDUCT
AND/OR
PACHECO AQUEDUCT

OCTOBER 1961

CREEGAN AND D'ANGELO
CIVIL ENGINEERS
1046 WEST TAYLOR STREET
SAN JOSE, CALIFORNIA

APPENDIX A
INDEX

Sheet No.			
1	Summary Sheet	Import via Interim South Bay Aqueduct and South Bay Aqueduct	Hetch Hetchy to 27,000 AF/Y
2			40,000 AF/Y
3			115,000 AF/Y
4	Summary Sheet	Import via South Bay Aqueduct	Hetch Hetchy to 27,000 AF/Y
5			40,000 AF/Y
6			115,000 AF/Y
7	Summary Sheet	Import via Pacheco Aqueduct	Hetch Hetchy to 27,000 AF/Y
8			40,000 AF/Y
9			115,000 AF/Y
10	Summary Sheet	Import via Interim Pacheco Aqueduct and Pacheco Aqueduct	Hetch Hetchy to 27,000 AF/Y
11			40,000 AF/Y
12			115,000 AF/Y
13	Summary Sheet	Import via South Bay Aqueduct and Pacheco Aqueduct	Hetch Hetchy to 27,000 AF/Y
14			40,000 AF/Y
15			115,000 AF/Y
16	Quantity of Water	Interim South Bay Aqueduct and/or South Bay Aqueduct	Hetch Hetchy to 27,000 AF/Y
17			40,000 AF/Y
18			115,000 AF/Y
19	Quantity of Water	Interim Pacheco Aqueduct and/or Pacheco Aqueduct	Hetch Hetchy to 27,000 AF/Y
20			40,000 AF/Yr
21			115,000 AF/Yr
22	Quantity of Water	South Bay Aqueduct and Pacheco Aqueduct	Hetch Hetchy to 27,000 AF/Yr
23			40,000 AF/Yr
24			115,000 AF/Yr
25	Cost of Hetch Hetchy Water		
26	Cost of Water at Delta when import via Interim South Bay Aqueduct or South Bay Aqueduct		
27	Cost of water at San Luis when import via Interim Pacheco Aqueduct or Pacheco Aqueduct		
28	Cost of water when import via Pacheco Aqueduct and South Bay Aqueduct		

INDEX (continued)

Sheet No.

29 Repayment Interim South Bay Aqueduct
30 Repayment South Bay Aqueduct
31 Repayment Pacheco Aqueduct
32 Repayment Interim Pacheco Aqueduct
33 Repayment Pacheco and South Bay Aqueducts when used in combination
34 Power Cost South Bay Aqueduct
35 Power Cost Interim South Bay Aqueduct
36 Power Cost Pacheco Aqueduct
37 Maintenance & Operation - South Bay Aqueduct
38 Maintenance & Operation - Pacheco Aqueduct
39 Treatment Cost When Hetch Hetchy Maximum 27,000 AF/Yr.
40 Treatment Cost When Hetch Hetchy Maximum 40,000 AF/Yr.

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W. DATE 11-61 SUBJECT SUMMARY SHEET SHEET NO. 1 OF 40

CHKD. BY J.M.S. DATE JOB NO 6190

IMPORT VIA SOUTH BAY AQUEDUCT (INTERIM)

HETCH HETCHY TO 27,000 AF/YR MAX.

NOTE:

COST, IN MILLIONS OF DOLLARS
IMPORT, IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet No.	HETCH HETCHY	INTERIM SOUTH BAY AQUEDUCT							TOTAL ANNUAL COST
→	25	16	26	29	29	35	37	39	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	REPAYMENT ESCALATION COST	POWER COST	MAINTENANCE & OPERATION	TREATMENT COST	
1964	1.15	23.5	.158	.650	—	.181	.209	—	2.348
1965	1.28	51.6	.348	.650		.398	.209		2.885
1966	1.41	70.5	.476	.650		.542	.209		3.287
1967	1.50	72.0	.252	.650		.626	.209		3.237
1968	1.60	74.0	.260	.650		.645	.209		3.364
1969	1.675	77.0	.270	.650		.966	.209		3.770
1970	1.65	80.0	.375	.650	—	1.003	.209	—	3.887
1974	1.65	88.0	.412	2.395	.157	.678	.209	.252	5.753
1975	1.65	90.5	.424	2.395	.157	.696	.280	.259	5.861
1980	1.65	103.0	.478	2.395	.157	.790	.280	.297	6.047
1981	1.65	104.5	.651	2.395	.157	.800	.280	.305	6.238
1990	1.65	122.0	.765	2.395	.157	.935	.280	.503	6.685
2000	1.65	166.0	1.045	2.395	.157	1.280	.280	.758	7.565
2002	1.65	175.0	1.110	2.395	.157	1.350	.280	.772	7.714
2003	1.65	178.0	1.120	3.376	1.099	1.370	.420	.779	9.814
2004	1.65	182.5	1.153	2.726	.942	1.405	.420	.784	9.080
2010	1.65	207.5	1.305	2.726	.942	1.600	.420	1.063	9.706
2013	1.65	222.0	1.400	2.726	.942	1.710	.420	.903	9.751
2014	1.65	226.5	1.430	.981	.942	1.745	.420	.909	8.077
2020	1.65	258.0	1.625	.981	.942	1.990	.420	.934	8.542

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W. DATE 11-61

CHKD. BY J.M.S. DATE

SUBJECT SUMMARY SHEET

SHEET NO. 2 OF 40

JOB NO. 61-90

IMPORT VIA SOUTH BAY AQUEDUCT (INTERIM)
HETCH HETCHY TO 40,000 AF/YR MAX.

NOTE:

COST, IN MILLIONS OF DOLLARS
IMPORT, IN THOUSANDS OF ACRE FEET PER YEAR

Refer to sheet No. →	HETCH HETCHY	INTERIM SOUTH BAY AQUEDUCT							TOTAL ANNUAL COST
	25	7	26	29	29	35	37	40	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	REPAYMENT ESCALATION COST	POWER COST	MAINTENANCE & OPERATION	TREATMENT COST	
1964	1.15	23.5	.158	.650	—	.181	.209	—	2.348
1965	1.28	51.6	.348	.650		.398	.209		2.885
1966	1.41	70.5	.476	.650		.542	.209		3.287
1967	1.50	72.0	.252	.650		.626	.209		3.237
1968	1.60	74.0	.260	.650		.645	.209		3.364
1969	1.675	77.0	.270	.650		.966	.209		3.770
1970	1.65	80.0	.375	.650		1.003	.209		3.887
1978	2.45	87.0	.408	.650	—	1.092	.209		4.809
1979	2.45	88.0	.412	2.395	.419	1.103	.280	—	7.059
1980	2.45	90.0	.423	2.395	.419	.694	.280	.263	6.934
1981	2.45	91.5	.575	2.395	.419	.705	.280	.269	7.093
1990	2.45	109.0	.690	2.395	.419	.843	.280	.328	7.405
2000	2.45	152.5	.965	2.395	.419	1.175	.280	.576	8.260
2003	2.45	164.5	1.040	2.395	.419	1.265	.280	.598	8.447
2004	2.45	169.5	1.070	1.745	.419	1.305	.280	.604	7.873
2005	2.45	174.0	1.100	1.745	.419	1.340	.280	.847	8.181
2006	2.45	178.0	1.185	2.726	1.449	1.370	.420	.853	10.392
2010	2.45	194.5	1.225	2.726	1.449	1.495	.420	.878	10.643
2018	2.45	234.0	1.475	2.726	1.449	1.800	.420	1.179	11.499
2019	2.45	239.0	1.505	.981	1.030	1.840	.420	1.184	9.410
2020	2.45	245.0	1.543	.981	1.030	1.890	.420	1.188	9.502

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W. DATE 11-61 SUBJECT SUMMARY SHEET SHEET NO. 3 OF 40

CHKD. BY J.M.S. DATE ______ JOB NO. 61-90

IMPORT VIA SOUTH BAY AQUEDUCT (INTERIM)

HETCH HETCHY TO 115,000 AF/YR MAX.

NOTE:

COST, IN MILLIONS OF DOLLARS

IMPORT, IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet No. →	HETCH HETCHY 25	INTERIM SOUTH BAY AQUEDUCT 18	26	29	29	35	37		TOTAL ANNUAL COST
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	REPAYMENT ESCALATION COST	POWER COST	MAINTENANCE & OPERATION	TREATMENT COST	
1964	1.15	23.5	.158	.650	—	.181	.209	—	2.348
1965	1.28	51.6	.348	.650		.398	.209		2.885
1966	1.41	70.5	.476	.650		.542	.209		3.287
1967	1.50	72.0	.252	.650		.626	.209		3.237
1968	1.60	74.0	.260	.650		.645	.209		3.364
1969	1.675	77.0	.270	.650		.966	.209		3.770
1970	1.65	80.0	.375	.650		1.003	.209		3.887
1980	2.27	86.0	.402	.650		1.080	.209		4.611
1981	2.34	86.5	.540	.650		1.085	.209		4.824
1982	2.37	87.0	.550	.650	—	1.092	.209		4.871
1984	2.43	88.0	.560	2.395	.680	.678	.280		7.023
1990	2.94	92.0	.575	*2.395	.680	.709	.280		7.579
2000	3.77	119.0	.750	2.395	.680	.913	.280		8.788
2003	4.13	125.0	.785	2.395	.680	.958	.280		9.228
2004	4.25	127.0	.800	1.745	.680	.974	.280		8.729
2010	4.97	138.0	.876	1.745	.680	1.060	.280		9.610
2020	5.92	170.0	1.075	1.745	.680	1.302	.280	—	11.002

CIVIL ENGINEERS
CALCULATION SHEET

BY J.F.E. DATE 11-61 SUBJECT SUMMARY SHEET SHEET NO. 4 OF 40
CHKD. BY J.M.S. DATE JOB NO. 61-90

IMPORT VIA SOUTH BAY AQUEDUCT
HETCH HETCHY TO 27000 AF/YR MAX.

NOTE:
COST IN MILLIONS OF DOLLARS
IMPORT IN THOUSANDS OF ACRE FEET PER YEAR

efer. To	HETCH HETCHY	SOUTH BAY AQUEDUCT							TOTAL ANNUAL COST
heet No. →	25	16	26	30	30	34	37	39	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	REPAYMENT ESCALATION COST	POWER COST	MAINTENANCE & OPERATION	TREATMENT COST	
1964	1.15	23.5	.158	.981	—	.067	.14	—	2.496
1965	1.28	51.6	.348	.981	—	.148	.14	—	2.897
1966	1.41	70.5	.476	.981	—	.202	.14	—	3.209
1967	1.50	72.	.252	.981	—	.277	.14	—	3.150
1968	1.6	74.	.26	.981	—	.285	.14	—	3.266
1969	1.675	77.	.27	.981	—	.593	.14	—	3.659
1970	1.65	80.	.375	.981	—	.616	.14	—	3.762
1974	1.65	88.	.412	1.962	.118	.678	.28	.252	5.352
1975	1.65	90.5	.424	1.962	.118	.696	.28	.259	5.389
1980	1.65	103.	.478	1.962	.118	.79	.28	.297	5.575
1981	1.65	104.5	.651	1.962	.118	.8	.28	.305	5.766
1990	1.65	122.	.765	1.962	.118	.935	.28	.503	6.213
2000	1.65	166.	1.045	1.962	.118	1.28	.28	.758	7.093
2002	1.65	175.	1.110	2.942	1.054	1.35	.42	.772	9.298
2003	1.65	178.	1.12	2.942	1.054	1.37	.42	.779	9.335
2004	1.65	182.5	1.153	1.962	1.054	1.405	.42	.783	8.427
2010	1.65	207.5	1.305	1.962	1.054	1.6	.42	1.063	9.054
2013	1.65	222.	1.4	1.962	1.054	1.71	.42	1.075	9.271
2014	1.65	226.5	1.43	.981	.936	1.745	.42	.909	8.071
2020	1.65	258.	1.625	.981	.936	1.99	.42	.935	8.537

CIVIL ENGINEERS
CALCULATION SHEET

BY J.F.E. DATE 11-61
CHKD. BY J.M.S. DATE
SUBJECT SUMMARY SHEET
IMPORT VIA SOUTH BAY AQUEDUCT
HETCH HETCHY TO 40,000 AF/YR MAX.
SHEET NO. 5 OF 40
JOB NO. 61-90

NOTE:

COST IN MILLIONS OF DOLLARS
IMPORT IN THOUSANDS OF ACRE FEET PER YEAR

efer To heet No. →	HETCH HETCHY	SOUTH BAY AQUEDUCT							TOTAL ANNUAL COST
	25	7	26	30	30	34	37	40	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	REPAYMENT ESCALATION COST	POWER COST	MAINTENANCE & OPERATION	TREATMENT COST	
1964	1.15	23.5	.158	.981	—	.067	.14	—	2.496
1965	1.28	51.6	.348	.981	—	.148	.14	—	2.897
1966	1.41	70.5	.476	.981	—	.202	.14	—	3.209
1967	1.50	72.	.252	.981	—	.277	.14	—	3.150
1968	1.6	74.	.26	.981	—	.285	.44	—	3.266
1969	1.675	77.	.270	.981	—	.593	.14	—	3.659
1970	1.65	80.	.375	.981	—	.616	.14	—	3.762
1978	2.45	87.	.408	.981	—	.67	.14	—	4.649
1979	2.45	88.	.412	1.962	.265	.678	.28	—	6.047
1980	2.45	90.	.420	1.962	.265	.694	.28	.263	6.334
1981	2.45	91.5	.575	1.962	.265	.705	.28	.269	6.506
1990	2.45	109	.69	1.962	.265	.843	.28	.328	6.818
2000	2.45	152.5	.965	1.962	.265	1.175	.28	.576	7.673
2003	2.45	164.5	1.04	1.962	.265	1.265	.28	.598	7.860
2004	2.45	169.5	1.07	.981	.265	1.305	.28	.602	6.953
2005	2.45	174.	1.1	.981	.265	1.34	.28	.848	7.263
2006	2.45	178.	1.125	1.962	1.325	1.37	.42	.852	9.504
2010	2.45	194.5	1.225	1.962	1.325	1.495	.42	.878	9.755
2018	2.45	234.	1.475	1.962	1.325	1.8	.42	1.179	10.611
2019	2.45	239.	1.505	.981	1.06	1.84	.42	1.183	9.439
2020	2.45	245.	1.543	.981	1.06	1.89	.42	1.188	9.532

CIVIL ENGINEERS

CALCULATION SHEET

BY J.F.E. DATE 11-61 SUBJECT SUMMARY SHEET SHEET NO. 6 OF 40

CHKD. BY J.N.S. DATE JOB NO. 61-90

IMPORT VIA SOUTH BAY AQUEDUCT

HETCH HETCHY TO 115000 AF/YR MAX.

NOTE:

COST IN MILLIONS OF DOLLARS
IMPORT IN THOUSANDS OF ACRE FEET PER YEAR

efer To	HETCH HETCHY	SOUTH BAY AQUEDUCT							TOTAL ANNUAL COST
heet No. →	25	8	26	30	30	34	37	—	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	REPAYMENT ESCALATION COST	POWER COST	MAINTENANCE & OPERATION	TREATMENT COST	
1964	1.15	23.5	.158	.981	—	.067	.14	—	2.496
1965	1.28	51.6	.348	.981	—	.148	.14	—	2.897
1966	1.41	70.5	.476	.981	—	.202	.14	—	3.209
1967	1.50	72.	.252	.981	—	.277	.14	—	3.150
1968	1.6	74.	.26	.981	—	.285	.14	—	3.266
1969	1.675	77.	.270	.981	—	.593	.14	—	3.659
1970	1.65	80.	.375	.981	—	.616	.14	—	3.762
1980	2.27	86.	.402	.981	—	.662	.14	—	4.455
1981	2.34	86.5	.540	.981	—	.665	.14	—	4.666
1982	2.37	87.	.55	.981	—	.67	.14	—	4.711
1984	2.43	88.	.56	1.962	.412	.678	.28	—	6.322
1990	2.94	92.	.575	1.962	.412	.709	.28	—	6.878
2000	3.77	119.	.75	1.962	.412	.913	.28	—	8.087
2003	4.13	125.	.785	1.962	.412	.958	.28	—	8.527
2004	4.25	127.	.80	.981	.412	.974	.28	—	7.697
2010	4.97	138.	.875	.981	.412	1.06	.28	—	8.578
2020	5.92	170.	1.075	.981	.412	1.302	.28	—	9.970

CIVIL ENGINEERS

CALCULATION SHEET

BY J.F.E. DATE 11-67

CHKD. BY J.M.S. DATE

SUBJECT SUMMARY SHEET

SHEET NO. 7 OF 40

JOB NO. 61-90

IMPORT VIA. PACHECO AQUEDUCT

HETCH HETCHY TO 27,000AF/YR MAX.

NOTE:

COST IN MILLIONS OF DOLLARS

IMPORT IN THOUSANDS OF ACRE FEET PER YEAR

Refer to sheet No.	HETCH HETCHY	PACHECO AQUEDUCT							TOTAL ANNUAL COST
	25	9	27	31	36	36	38	39	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	POWER COST AT SANLUIS	POWER COST AT ANDERSON	MAINTENANCE & OPERATION	TREATMENT COST	
1970	1.650	80.	.572	1.118	.151	.024	.197	—	3.712
1980	1.650	103.	.841	1.118	.195	.031	.197	.297	4.329
1990	1.650	122.	1.096	1.118	.231	.036	.197	.503	4.831
2000	1.650	166.	1.550	1.118	.314	.049	.197	.758	5.636
2009	1.650	203.	1.949	1.118	.384	.060	.197	1.057	6.415
2010	1.650	207.5	1.995	—	.393	.061	.197	1.063	5.359
2020	1.650	258.	2.531	—	.488	.076	.197	.935	5.887

CIVIL ENGINEERS

CALCULATION SHEET

BY J.F.E. DATE 11-61
CHKD. BY J.M.S. DATE
SUBJECT SUMMARY SHEET
SHEET NO. B OF 40
JOB NO. 61-90

IMPORT VIA. PACHECO AQUEDUCT
HETCH HETCHY TO 40,000 AF/YR MAX.

NOTE:
COST IN MILLIONS OF DOLLARS
IMPORT IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet No.	HETCH HETCHY – 25	PACHECO AQUEDUCT 20	27	31	36	36	38	40	TOTAL ANNUAL COST
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	POWER COST AT SANLUIS	POWER COST AT ANDERSON	MAINTENANCE & OPERATION	TREATMENT COST	
1970	1.650	80.	.572	1.082	.151	.024	.197	—	3.676
1979	2.450	88.	.686	1.082	.166	.026	.197	—	4.607
1980	2.450	90.	.711	1.082	.170	.027	.197	.263	4.900
1990	2.450	109.	.966	1.082	.208	.032	.197	.328	5.263
2000	2.450	152.5	1.415	1.082	.289	.046	.197	.576	6.054
2009	2.450	190.	1.819	1.082	.360	.056	.197	.870	6.834
2010	2.450	194.5	1.865	—	.368	.058	.197	.878	5.816
2020	2.450	245.	2.401	—	.464	.072	.197	1.188	6.772

BY J.F.E. DATE 11-[illegible] SUBJECT SUMMARY SHEET SHEET NO. 9 OF 40

CHKD. BY J.M.S. DATE .... JOB NO. 61-90

IMPORT VIA. PACHECO AQUEDUCT
HETCH HETCHY TO 115,000 AF/YR MAX.

NOTE:

COST IN MILLIONS OF DOLLARS
IMPORT IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet No.	HETCH HETCHY	PACHECO AQUEDUCT							TOTAL ANNUAL COST
	25	21	27	31	36	36	38	—	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	POWER COST AT SAN LUIS	POWER COST AT ANDERSON	MAINTENANCE & OPERATION	TREATMENT COST	
1970	1.650	80.	.572	1.000	.151	.024	.197	—	3.594
1980	2.270	86.	.671	1.000	.162	.025	.197	—	4.325
1990	2.940	92.	.796	1.000	.173	.027	.197	—	5.133
2000	3.770	119.	1.080	1.000	.225	.035	.197	—	6.307
2009	4.800	136.5	1.284	1.000	.256	.040	.197	—	7.577
2010	4.970	138.	1.300	—	.261	.041	.197	—	6.769
2020	5.920	170.	1.651	—	.322	.056	.197	—	8.146

CALCULATION SHEET

BY H.W. DATE 11-61
CHKD. BY J.M.S. DATE
SUBJECT SUMMARY SHEET
INTERIM PACHECO AQUEDUCT
HETCH HETCHY TO 40,000 AF/YR MAX.
SHEET NO. 11 OF 40
JOB NO. 61-90

NOTE:

COST, IN MILLIONS OF DOLLARS
IMPORT, IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet No. →	HETCH HETCHY	INTERIM PACHECO AQUEDUCT								TOTAL ANNUAL COST
	25	20	27	32	32	36		38	40	
YEAR	WATER COST	IMPORT	WATER COST	INTERIM REPAYMENT	REPAYMENT U.S.B.R. COST	POWER COST SAN LUIS	ANDER.	MAINTENANCE & OPERATION	TREATMENT COST	
1963	1.10	62.5	.416	1.040	—	.390	.019	.240	—	3.205
1964	1.15	65	.436	1.040		.405	.020	.240		3.291
1966	1.41	70.5	.485	1.040		.434	.021	.240		3.630
1967	1.50	72	.495	1.040		.449	.021	.240		3.745
1969	1.675	77	.540	1.040	—	.480	.023	.240		3.998
1970	1.65	80	.572	1.040	.368	.151	.024	.197		4.002
1979	2.45	88	.686	1.040	.368	.166	.026	.197	—	4.933
1980	2.45	90	.711	1.040	.368	.170	.027	.197	.263	5.226
1990	2.45	109	.966	1.040	.368	.208	.032	.197	.328	5.589
2000	2.45	152.5	1.415	1.040	.368	.289	.046	.197	.576	6.381
2002	2.45	162	1.515	1.040	.368	.306	.048	.197	.592	6.516
2003	2.45	164.5	1.543	—	.368	.311	.049	.197	.598	5.516
2009	2.45	190	1.819		.368	.360	.056	.197	.870	6.120
2010	2.45	194.5	1.865		—	.368	.058	.197	.878	5.816
2020	2.45	245	2.401	—	—	.464	.072	.197	1.188	6.772

CALCULATION SHEET

BY H.W. DATE 11-61 SUBJECT SUMMARY SHEET SHEET NO. 10 OF 40
CHKD. BY J.M.S. DATE .... JOB NO. 61-90

INTERIM PACHECO AQUEDUCT
HETCH HETCHY TO 27,000 AF/YR MAX.

NOTE:
COST, IN MILLIONS OF DOLLARS
IMPORT, IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet No.	HETCH HETCHY	INTERIM PACHECO AQUEDUCT								TOTAL ANNUAL COST
	— 25	19	27	32	32	36		38	39	
YEAR	WATER COST	IMPORT	WATER COST	INTERIM REPAYMENT	REPAYMENT U.S.B.R. COST	POWER COST SAN LUIS	ANDER.	MAINTENANCE & OPERATION	TREATMENT COST	
1963	1.10	62.5	.416	1.040	—	.390	.019	.240	—	3.205
1964	1.15	65	.436	1.040		.405	.020	.240		3.291
1966	1.41	70.5	.484	1.040		.434	.021	.240		3.629
1967	1.50	72	.495	1.040		.449	.021	.240		3.745
1969	1.675	77	.540	1.040	—	.480	.023	.240		3.998
1970	1.65	80	.572	1.040	.400	.151	.024	.197	—	4.034
1980	1.65	103	.841	1.040	.400	.195	.031	.197	.297	4.651
1990	1.65	122	1.096	1.040	.400	.231	.036	.197	.503	5.153
2000	1.65	166	1.550	1.040	.400	.314	.049	.197	.758	5.958
2002	1.65	175	1.645	1.040	.400	.331	.052	.197	.772	6.087
2003	1.65	178	1.678	—	.400	.337	.053	.197	.779	5.094
2009	1.65	203	1.949		.400	.384	.060	.197	1.056	5.696
2010	1.65	207.5	1.995		—	.393	.061	.197	1.063	5.359
2020	1.65	258	2.531	—	—	.488	.076	.197	.934	5.876

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W. DATE 11-61
CHKD. BY J.M.S. DATE
SUBJECT SUMMARY SHEET
INTERIM PACHECO AQUEDUCT
HETCH HETCHY TO 115,000 AF/YR MAX.
SHEET NO. 12 OF 4
JOB NO. 61-90

NOTE:

COST, IN MILLIONS OF DOLLARS
IMPORT, IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet No.	HETCH HETCHY	INTERIM PACHECO AQUEDUCT								TOTAL ANNUAL COST
	— 25	21	27	32	32	36		38	—	
YEAR	WATER COST	IMPORT	WATER COST	INTERIM REPAYMENT	REPAYMENT U.S.B.R. COST	POWER COST SAN LUIS	ANDER.	MAINTENANCE & OPERATION	TREATMENT COST	
1963	1.10	$62^{\underline{5}}$	.416	1.040	—	.390	.019	.240	—	3.205
1964	1.15	65	.436	1.040		.405	.020	.240		3.291
1966	1.41	$70^{\underline{5}}$	.484	1.040		.434	.021	.240		3.629
1967	1.50	72	.495	1.040		.449	.021	.240		3.745
1969	1.675	77	.540	1.040	—	.480	.023	.240		3.998
1970	1.65	80	.572	1.040	.279	.151	.024	.197		3.913
1980	2.37	86	.671	1.040	.279	.162	.025	.197		4.644
1990	2.94	92	.796	1.040	.279	.173	.027	.197		5.452
2000	3.77	119	1.080	1.040	.279	.225	.035	.197		6.626
2002	4.02	$123^{\underline{5}}$	1.130	1.040	.279	.234	.037	.197		6.937
2003	4.13	125	1.148	—	.279	.236	.037	.197		6.027
2009	4.80	$136^{\underline{5}}$	1.284	—	.279	.256	.040	.197		6.856
2010	4.97	138	1.300	—	—	.261	.041	.197		6.769
2020	5.92	170	1.651	—	—	.322	.056	.197	—	8.146

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W. DATE 11-61

CHKD. BY J.M.S. DATE

SUBJECT SUMMARY SHEET

SHEET NO. 13 OF 40

JOB NO. 61-90

IMPORT VIA SOUTH BAY AQUEDUCT & PACHECO AQUEDUCT
HETCH HETCHY TO 27,000 AF/YR MAX.

NOTE:

COST, IN MILLIONS OF DOLLARS
IMPORT, IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet No. →	HETCH HETCHY	SOUTH BAY AQUEDUCT					PACHECO AQUEDUCT							TOTAL ANNUAL COST
	25	22	28	33	34	37	22	28	33	36		38	39	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	POWER COST	M & O	IMPORT	WATER COST P.&S.B. AQUEDUCT	REPAYMENT	POWER COST		M & O	WATER TREATMENT	
										SAN LUIS	ANDERSON			
1964	1.15	23.5	.158	.981	.067	.140	—	—	—			—	—	2.496
1965	1.28	51.6	.349	.981	.148	.140	—	—	—			—	—	2.898
1966	1.41	70.5	.481	.981	.202	.140	—	—	—			—	—	3.214
1967	1.54	72.	.252	.981	.271	.140	—	—	—			—	—	3.184
1969	1.675	77.	.270	.981	.594	.140	—	—	—			—	—	3.660
1970	1.65	30.	SEE TOTAL UNDER "WATER COST-PACHECO AQUEDUCT"	.981	.231	.140	50.	.412	.844	.095	.015	.197	—	4.565
1980	1.65	53.		.981	.408	.140	50.	.559	.844	.095	.015	.197	.297	5.186
1981	1.65	54.5		.981	.420	.140	50.	.667	.844	.095	.015	.197	.305	5.314
1990	1.65	72.		.981	.555	.140	50.	.830	.844	.095	.015	.197	.503	5.810
1994	1.65	88.		.981	.678	.140	52.	.954	.844	.099	.015	.197	.523	6.081
2000	1.65	88.		.981	.678	.140	78.	1.224	.844	.147	.024	.197	.758	6.643
2003	1.65	88.		.981	.678	.140	90.	1.352	.844	.170	.027	.197	.779	6.818
2004	1.65	88.		—	.678	.140	95.	1.405	.844	.179	.028	.197	.783	5.904
2009	1.65	88.		—	.678	.140	115.	1.624	.844	.218	.034	.197	1.057	6.442
2010	1.65	88.		—	.678	.140	119.5	1.669	—	.226	.035	.197	1.063	5.658
2020	1.65	88.		—	.678	.140	170.	2.206	—	.322	.051	.197	.935	6.179

CALCULATION SHEET

BY H.W. DATE 11-61
CHKD. BY J.M.S. DATE
SUBJECT SUMMARY SHEET
SHEET NO. 14 OF 40
JOB NO. 61.90

IMPORT VIA SOUTH BAY AQUEDUCT & PACHECO AQUEDUCT
HETCH HETCHY TO 40,000 AF/YR MAX.

NOTE:
COST, IN MILLIONS OF DOLLARS
IMPORT, IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet No. →	HETCH HETCHY	SOUTH BAY AQUEDUCT					PACHECO AQUEDUCT							TOTAL ANNUAL COST
	25	23	28	33	34	37	23	27	33	36		38	40	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	POWER COST	M&O	IMPORT	WATER COST P&S.B. AQUEDUCT	REPAYMENT	POWER COST		M&O	WATER TREATMENT	
1964	1.15	23.5	.158	.981	.067	.140	—	—	—	SAN LUIS	ANDERSON	—	—	2.496
1965	1.28	51.6	.349	.981	.147	.140	—	—	—			—	—	2.897
1966	1.41	70.5	.481	.981	.201	.140	—	—	—			—	—	3.213
1967	1.54	72.	.252	.981	.271	.140	—	—	—			—	—	3.184
1969	1.675	77.	.270	.981	.594	.140	—	—	—			—	—	3.660
1970	1.65	30.	SEE TOTAL UNDER "WATER COST-PACHECO AQUEDUCT"	.981	.231	.140	50.	.412	.810	.095	.015	.197	—	4.531
1979	2.45	38.		.981	.295	.140	50.	.484	.810	.095	.015	.197	—	5.465
1980	2.45	40.		.981	.308	.140	50.	.498	.810	.095	.015	.197	.263	5.757
1990	2.45	59.		.981	.455	.140	50.	.749	.810	.095	.015	.197	.328	6.220
1997	2.45	88.		.981	.678	.140	52.	.958	.810	.097	.015	.197	.560	6.886
2000	2.45	88.		.981	.678	.140	65.5	1.099	.810	.123	.020	.197	.576	7.074
2003	2.45	88.		.981	.678	.140	78.	1.232	.810	.147	.023	.197	.598	7.356
2004	2.45	88.		—	.678	.140	82.	1.275	.810	.155	.024	.197	.602	6.331
2009	2.45	88.		—	.678	.140	102.	1.494	.810	.193	.030	.197	.870	6.862
2010	2.45	88.		—	.678	.140	106.5	1.540	—	.202	.031	.197	.878	6.116
2020	2.45	88.		—	.678	.140	157.	2.076	—	.297	.047	.197	1.188	7.073

CALCULATION SHEET

BY H.W. DATE 11-61 SUBJECT SUMMARY SHEET SHEET NO. 15 OF 40
CHKD. BY J.M.S. DATE JOB NO. 61-90

IMPORT VIA SOUTH BAY AQUEDUCT & PACHECO AQUEDUCT
HETCH HETCHY TO 115,000 AF/YR MAX.

NOTE:

COST, IN MILLIONS OF DOLLARS
IMPORT, IN THOUSANDS OF ACRE FEET PER YEAR

Refer to Sheet	HETCH HETCHY	SOUTH BAY AQUEDUCT					PACHECO AQUEDUCT							TOTAL ANNUAL COST
No. —	25	24	28	33	34	37	24	28	33	36		38	—	
YEAR	WATER COST	IMPORT	WATER COST	REPAYMENT	POWER COST	M & O	IMPORT	WATER COST P & S.B. AQUEDUCT	REPAYMENT	POWER COST		M & O	WATER TREATMENT	
1964	1.15	23.5	.158	.981	.067	.140	—	—	—	SAN LUIS	ANDERSON	—	—	2.496
1965	1.28	51.6	.349	.981	.148	.140	—	—	—			—	—	2.898
1966	1.41	70.5	.481	.981	.208	.140	—	—	—			—	—	3.214
1967	1.54	72.	.252	.981	.271	.140	—	—	—			—	—	3.184
1969	1.675	77.	.270	.981	.594	.140	—	—	—			—	—	3.660
1970	1.65	30.	SEE TOTAL UNDER "WATER COST - PACHECO AQUEDUCT"	.981	.231	.140	50.	.412	.677	.095	.015	.197	—	4.398
1980	2.27	36.		.981	.277	.140	50.	.479	.677	.095	.015	.197	—	5.131
1981	2.34	36.5		.981	.281	.140	50.	.548	.677	.095	.015	.197	—	5.274
1990	2.94	42.		.981	.322	.140	50.	.641	.677	.095	.015	.197	—	6.008
2000	3.77	69.		.981	.531	.140	50.	.824	.677	.095	.015	.197	—	7.230
2003	4.13	75.		.981	.572	.140	50.	.865	.677	.095	.015	.197	—	7.678
2004	4.25	77.		—	.593	.140	50.	.881	.677	.095	.015	.197	—	6.848
2009	4.80	86.5		—	.668	.140	50.	.964	.677	.095	.015	.197	—	7.556
2010	4.97	88.		—	.678	.140	50.	.974	—	.095	.015	.197	—	7.069
2020	5.92	88.		—	.678	.140	82.	1.326	—	.154	.024	.197	—	8.459

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W.FIFE DATE 11-61 SUBJECT QUANTITY OF WATER SHEET NO. 16 OF 40
CHKD. BY J.M.S. DATE .... INTERIM SOUTH BAY AQUEDUCT, JOB NO. 61-90
AND/OR SOUTH BAY AQUEDUCT
AND HETCH HETCHY TO 27,000. AF/YR. MAXIMU

YEAR	TOTAL IMPORT A.F. / YR.	HH 1000 A.F./YR.	SBA 1000 A.F./YR.
1964	41,500	18	23.5
1965	71,600	20	51.6
1966	92,500	22	70.5
1967	95,500	23.5	72
1968	99,000	25	74
1969	103,000	26	77
1970	107,000	27	80
1974	115,000	27	88
1975	117,500	27	90.5
1980	130,000	27	103
1981	131,500	27	104.5
1990	149,000	27	122
2000	193,000	27	166
2002	202,000	27	175
2003	205,000	27	178
2004	209,500	27	182.5
2010	234,500	27	207.5
2013	249,000	27	222
2014	253,500	27	226.5
2020	285,000	27	258

INTERIM SOUTH BAY AQUEDUCT
OR SOUTH BAY AQUEDUCT

Construct Secon
Stage Of SOUTH
BAY AQUEDUCT
And Complete
INTERIM SOUTH
BAY AQUEDUCT.

Construct Thir
Stage Of Sout
BAY AQUEDUCT.

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W. & J.F.F. DATE 11-61
CHKD. BY J.M.S. DATE

SUBJECT QUANTITY OF WATER SHEET NO. 18 OF 40
INTERIM SOUTH BAY AQUEDUCT JOB NO. 61-90
AND/OR SOUTH BAY AQUEDUCT
AND HETCH HETCHY TO 115,000. A.F./YR. MAXIMUM

YEAR	TOTAL IMPORT A.F. / YR.	HH 1000 A.F./YR.	SBA 1000 A.F./YR.
1964	41,500	18	23.5
1965	71,600	20	51.6
1966	92,500	22	70.5
1967	95,500	23.5	72
1968	99,000	25	74
1969	103,000	26	77
1970	107,000	27	80
1980	130,000	44	86
1981	132,000	45.5	86.5
1982	133,000	46	87
1984	135,000	47	88
1990	149,000	57	92
2000	192,000	73	119
2003	205,000	80	125
2004	209,000	82	127
2010	234,000	96	138
2020	285,000	115	170

INTERIM SOUTH BAY AQUEDUCT
OR SOUTH BAY AQUEDUCT

Construct Second
Stage Of SOUTH
BAY AQUEDUCT
And Complete
INTERIM SOUTH
BAY AQUEDUCT.

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W.&JFE DATE 11-61 SUBJECT QUANTITY OF WATER SHEET NO. 17 OF 40
CHKD. BY J.M.S. DATE INTERIM SOUTH BAY AQUEDUCT, JOB NO. 61-90
AND/OR SOUTH BAY AQUEDUCT
AND HETCH HETCHY TO 40,000 AF/YR. MAXIMU

YEAR	TOTAL IMPORT A.F. / YR.	HH 1,000 AF/YR	SBA 1000 AF/YR.
1964	41,500	18	23.5
1965	71,600	20	51.6
1966	92,500	22	70.5
1967	95,500	23.5	72
1968	99,000	25	74
1969	103,000	26	77
1970	107,000	27	80
1978	127,000	40	87
1979	128,000	40	88
1980	130,000	40	90
1981	131,500	40	91.5
1990	149,000	40	109
2000	192,500	40	152.5
2003	204,500	40	164.5
2004	209,500	40	169.5
2005	214,000	40	174.
2006	218,000	40	178
2010	234,500	40	194.5
2018	274,000	40	234
2019	279,000	40	239
2020	285,000	40	245

INTERIM SOUTH BAY AQUEDUCT
OR SOUTH BAY AQUEDUCT

Construct Secon
Stage Of South
BAY AQUEDUCT
And Complete
INTERIM SOUTH
BAY AQUEDUCT.

Construct Thir
Stage Of Sout
BAY AQUEDUCT.

CALCULATION SHEET

BY H.W.&JFE DATE 11-61
CHKD. BY J.M.S. DATE

SUBJECT QUANTITY OF WATER
INTERIM PACHECO AQUEDUCT
AND/OR PACHECO AQUEDUCT
AND HETCH HETCHY TO 27,000 A.F./YR.

SHEET NO. 19 OF 40
JOB NO. 61-90

YEAR	TOTAL IMPORT A.F./YR.	HH 1000 A.F./YR.		PA 1000 A.F./YR.	
1963	79,500	17		62.5	INTERIM PACHECO AQUEDUCT
1964	83,000	18		65	
1966	92,500	22		70.5	
1967	95,500	23.5		72	
1969	103,000	26		77	
1970	107,000	27		80	PACHECO AQUEDUCT
1980	130,000	27		103	
1990	149,000	27		122	
2000	193,000	27		166	
2002	202,000	27		175	
2003	205,000	27		178	
2009	230,000	27		203	
2010	234,500	27		207.5	
2020	285,0.00	27		258	

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W.&JFE DATE 11-61 SUBJECT QUANTITY OF WATER SHEET NO. 10 OF 40
CHKD. BY J.M.S. DATE INTERIM PACHECO AQUEDUCT JOB NO. 61-90
AND/OR PACHECO AQUEDUCT
AND HETCH HETCHY TO 40,000 A.F./YR.

YEAR	TOTAL IMPORT A.F. / YR.	HH 1000 A.F./YR.		PA 1000 A.F./YR.	
1963	79500	17		62.5	INTERIM PACHECO AQUEDUCT
1964	83,000	18		65	
1966	92,500	22		70.5	
1967	95,500	23.5		72	
1969	103,000	26		77	
1970	107,000	27		80	PACHECO AQUEDUCT
1979	128,000	40		88	
1980	130,000	40		90	
1990	149,000	40		109	
2000	192,500	40		152.5	
2002	202,000	40		162	
2003	204,500	40		164.5	
2009	230,000	40		190	
2010	234,500	40		194.5	
2020	285,000	40		245	

BY H.W.&JFE DATE 11-61
CHKD. BY J.M.S. DATE

SUBJECT QUANTITY OF WATER
INTERIM PACHECO AQUEDUCT
AND/OR PACHECO AQUEDUCT
AND HETCH HETCHY TO 115,000 A.F./YR.

SHEET NO. 21 OF 40
JOB NO. 61-90

YEAR	TOTAL IMPORT A.F. / YR.	H.H. 1,000 A.F./YR.		PA 1,000 A.F./YR.	
1963	79,500	17		62.5	INTERIM PACHECO AQUEDUCT
1964	83,000	18		65	
1966	92,500	22		70.5	
1967	95,500	23.5		72	
1969	103,000	26		77	
1970	107,000	27		80	PACHECO AQUEDUCT
1980	130,000	44		86	
1990	149,000	57		92	
2000	192,000	73		119	
2002	201,500	78		123.5	
2003	205,000	80		125	
2009	229,500	93		136.5	
2010	234,000	96		138	
2020	285,000	115		170	

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W.E.J.F.E. DATE 11-61

CHKD. BY J.M.S. DATE

SUBJECT QUANTITY OF WATER
SOUTH BAY AQUEDUCT
AND PACHECO AQUEDUCT
AND HETCH HETCHY TO 27,000 A.F./YR. MAX.

SHEET NO. 22 OF 40

JOB NO. 61-90

YEAR	TOTAL IMPORT A.F./YR.	HH 1000 A.F./YR.	SBA 1000 A.F./YR.	PA 1000 A.F./YR.
1964	41,500	18	23.5	—
1965	71,600	20	51.6	—
1966	92,500	22	70.5	—
1967	95,500	23.5	72	—
1969	103,000	26	77	—
1970	107,000	27	30	50
1980	130,000	27	53	50
1981	131,500	27	54.5	50
1990	149,000	27	72	50
1994	167,000	27	88	52
2000	193,000	27	88	78
2003	205,000	27	88	90
2004	210,000	27	88	95
2009	230,000	27	88	115
2010	234,000	27	88	119.5
2020	285,000	27	88	170

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W.&JFE DATE 11-61	SUBJECT QUANTITY OF WATER SOUTH BAY AQUEDUCT AND PACHECO AQUEDUCT AND HETCH HETCHY TO 115,000 A.F./YR. MAX.	SHEET NO. 24 OF 40
CHKD. BY J.M.S. DATE		JOB NO. 61-90

YEAR	TOTAL IMPORT A.F. / YR.	HH 1000 A.F. / YR.	SBA 1000 A.F. / YR.	PA 1000 A.F. / YR.
1964	41,500	18	23.5	—
1965	71,600	20	51.6	—
1966	92,500	22	70.5	—
1967	95,500	23.5	72	—
1969	103,000	26	77	—
1970	107,000	27	30	50
1980	130,000	44	36	50
1981	132,000	45.5	36.5	50
1990	149,000	57	42	50
2000	192,000	73	69	50
2003	205,000	80	75	50
2004	209,000	82	77	50
2009	229,500	93	86.5	50
2010	234,000	96	88	50
2020	285,000	115	88	82

CALCULATION SHEET

BY H.W.&J.F.F. DATE 11-61
CHKD. BY J.M.S. DATE

SUBJECT QUANTITY OF WATER
SOUTH BAY AQUEDUCT
AND PACHECO AQUEDUCT
AND HETCH HETCHY TO 40,000 A.F./YR. MAX.

SHEET NO. 23 OF 40
JOB NO. 61-90

YEAR	TOTAL IMPORT A.F. /YR.	H.H. 1,000 A.F./YR.	SBA 1,000 A.F./YR.	PA 1,000 A.F./YR.
1964	41,500	18	23.5	—
1965	71,600	20	51.6	—
1966	92,500	22	70.5	—
1967	95,500	23.5	72	—
1969	103,000	26	77	—
1970	107,000	27	30	50
1979	128,000	40	38	50
1980	130,000	40	40	50
1990	149,000	40	59	50
1997	180,000	40	88	52
2000	193,500	40	88	65.5
2003	206000	40	88	78
2004	210,000	40	88	82
2009	230,000	40	88	102
2010	234,500	40	88	106.5
2020	285,000	40	88	157

CIVIL ENGINEERS

CALCULATION SHEET

BY YW DATE 10-26-61 SUBJECT COST OF HETCH-HETCHY WATER SHEET NO. 25 OF 40

CHKD. BY ____ DATE ____ JOB NO. 61-90

YEAR	MAX. Q = 27,000 AF/YR SHEET NOS. 4, 7, 10, 13, & 16			MAX. Q = 40,000 AF/YR SHEET NOS. 5, 8, 11, 14 & 17			MAX. Q = 115,000 AF/YR SHEET NOS 6, 9, 12, 15 & 18		
	Q 1000 AF/YR	UNIT COST $/AF	ANNUAL COST $×10⁻⁶	Q 1000 AF/YR	UNIT COST $/AF	ANNUAL COST $×10⁻⁶	Q 1000 AF/YR	UNIT COST $/AF	ANNUAL COST $×10⁻⁶
1964	18.0	64.00	1.150	18.0	64.00	1.150	18.0	64.00	1.150
1965	20.0	↓	1.280	20.0	↓	1.280	20.0	↓	1.280
1966	22.0	↓	1.410	22.0	↓	1.410	22.0	↓	1.410
1967	23.5	↓	1.500	23.5	↓	1.500	23.5	↓	1.500
1969	26.0	64.00	1.675	26.0	64.00	1.675	26.0	64.00	1.675
1970	27.0	61.00	1.650	27.0	61.00	1.650	27.0	61.00	1.650
1979	↓	↓	↓	40.0	↓	2.450	40.0	61.00	2.450
1980	↓	↓	↓	↓	↓	↓	44.0	51.50	2.270
1981	↓	↓	↓	↓	↓	↓	45.5	↓	2.340
1990	↓	↓	↓	↓	↓	↓	57.0	↓	2.940
1994	↓	↓	↓	↓	↓	↓	63.4	↓	3.265
2000	↓	↓	↓	↓	↓	↓	73.0	↓	3.770
2003	↓	↓	↓	↓	↓	↓	80.0	↓	4.130
2004	↓	↓	↓	↓	↓	↓	82.0	↓	4.250
2009	↓	↓	↓	↓	↓	↓	93.0	↓	4.800
2010	↓	↓	↓	↓	↓	↓	96.0	↓	4.970
2020	27.0	61.00	1.650	40.0	61.00	2.450	115.0	51.50	5.920

CIVIL ENGINEERS

CALCULATION SHEET

BY JW DATE 10-26-61
CHKD. BY .... DATE ....
SUBJECT COST OF WATER AT DELTA WHEN IMPORT VIA INTERIM SOUTH BAY AQUEDUCT OR SOUTH BAY AQUEDUCT
SHEET NO. 26 OF 40
JOB NO. 61-90

YEAR	MAX. HETCH-HETCHY Q= 27,000 AF/YR						MAX. HETCH-HETCHY Q= 49 000 AF/YR						MAX. HETCH-HETCHY Q= 115,000 AF/YR					
	Q 1000 AF/YR	AG Q	M&I Q	UNIT COST $/AF		ANNUAL COST x10⁻³	Q 1000 AF/YR	AG Q	M&I Q	UNIT COST $/AF.		ANNUAL COST x10⁻³	Q 1000 AF/YR	AG. Q	M&I Q	UNIT COST $/AF.		ANNUAL COST x10⁻³
				AG	M&I					AG	M&I					AG.	M&I	
1964	23.5	11.8	11.7	3.50	10.00	158	23.5	11.8	11.7	350	10.00	158	23.5	11.8	11.7	3.50	10.00	158
1965	51.6	25.8	25.8	3.50	10.00	348	51.6	25.8	25.8	3.50	10.00	348	51.6	25.8	25.8	3.50	10.00	348
1966	70.5	35.2	35.3	3.50	10.00	476	70.5	35.2	35.3	3.50	10.00	476	70.5	35.2	35.3	3.50	10.00	476
1967	72.0			3.50		252	72.0			3.50		252	72.0			350		252
1968	74.0			3.50		260	74.0			350		260	74.0			350		260
1969	77.0			3.50		270	77.0			350		270	77.0			3.50		270
1970	80.0			4.68		375	80.0			468		375	80.0			4.68		375
1974	88.0					412												
1975	90.5	SAME UNIT PRICE FOR ALL WATER				424		SAME UNIT PRICE FOR ALL WATER						SAME UNIT PRICE FOR ALL WATER				
1978							87.0					408						
1979							88.0					412						
1980	103.0			468		478	90.0			4.68		420	86.0			468		402
1981	104.5			630		651	91.5			6.30		575	86.5			6.30		540
1982													87.0					550
1984													88.0					560
1990	122.0					765	109.0					690	92.0					575
2000	166.0					1045	152.5					965	119.0					750
2002	175.0					1110												
2003	178.0					1120	164.5					1040	125.0					785
2004	182.5					1153	169.5					1070	127.0					800
2005							174.0					1100						
2006							178.0					1125						
2010	207.5					1305	194.5					1225	138.0					875
2013	222.0					1400												
2014	226.5					1430												
2016							234.0					1475						
2019							239.0					1505						
2020	258.0			630		1625	245.0			6.30		1543	170.0			630		1075

YRS 1964-1966 - WATER FOR SOUTH BAY AQUEDUCT PURCHASED FROM U.S.B.R. BY STATE

1966-2010 - WATER FROM STATE SOURCES - PRICES / DEPT. OF WATER RESOURCES

CIVIL ENGINEERS

CALCULATION SHEET

BY R.M.O. DATE 11:0:61
CHKD. BY .... DATE ....
SUBJECT COST OF WATER AT SAN LUIS SHEET NO. 27 OF 40
WHEN IMPORT VIA INTERIM JOB NO. 61-90
PACHECO AQUEDUCT OR PACHECO AQUEDUCT

YEAR	MAX. HETCH HETCHY Q=27000 AF/YR						MAX HETCH HETCHY Q=40000AF						MAX. HETCH HETCHY Q=115000 A.F./YR					
	Q 1000 AF/YR	AG Q (1000AF)	M&I Q (1000AF)	UNIT COST $/AF		ANNUAL COST x10⁻³ $	Q IN 1000 AF/YR	AG Q 1000AF	M&I Q 1000AF	UNIT COST $/AF		ANNUAL COST x10⁻³ $	Q in 1000 AF	AG Q (1000AF)	M&I Q (1000AF)	UNIT COST $/AF		ANNUAL COST x10⁻³ $
				AG	M&I					AG.	M&I					AG	M&I	
1963	62.5	32.2	30.3	3$^{\underline{50}}$	10$^{\underline{00}}$	416	62.5	32.2	30.3	3$^{\underline{50}}$	10$^{\underline{00}}$	416	62.5	32.2	30.3	3$^{\underline{50}}$	10$^{\underline{00}}$	416
1964	65	32.9	32.1			436	65	32.9	32.1			436	65	32.9	32.1			436
1966	70.5	33.9	36.6			484.5	70.5	33.9	36.6			484.5	70.5	33.9	36.6			484.5
1967	72	34.6	37.4			495	72	34.6	37.4			495	72	34.6	37.4			495
1969	77	35.4	41.6			540	77	35.4	41.6			540	77	35.4	41.6			540
1970	80	35.1	44.9			572	80	35.1	44.9			572	80	35.1	44.9			572
1979							88	29.8	58.2			686						
1980	103	29.1	73.9			841	90	29.1	60.9			711	86	29.1	56.9			671
1990	122	18.95	103.05			1095.8	109	18.95	90.05			965.8	92	18.95	73.05			795.8
2000	166	17	149			1549.5	152.5	17	135.5			1419.5	119	17	102			1079.5
2002	175	16.2	158.8			1644.7	162	16.2	145.8			1519.7	123.5	16.2	107.3			1129.7
2003	178	15.75	162.25			1677.7	164.5	15.75	148.75			1543.1	125	15.75	109.25			1147.7
2009	203	12.4	190.6			1909.4	190	12.4	177.6			1819.4	136.5	12.4	124.1			1284.4
2010	207.5	12.3	195.2			1995	194.5	12.3	182.2			1865	138	12.3	125.7			1300.0
2020	258	7.5	250.5			2531.1	245	7.5	237.5			2401.1	170	7.5	162.5			1651.1

CALCULATION SHEET

BY H.W. DATE 11-14-61
CHKD. BY J.M.S. DATE
SUBJECT COST OF WATER AT SAN LUIS & AT DELTA WHEN IMPORT VIA. PACHECO AQUEDUCT AND SOUTH BAY AQUEDUCT.
SHEET NO. 28 OF 40
JOB NO. 61-90

YEAR	MAX. HETCH HETCHY Q = 27,000 AF/YEAR							
	Q 1000 AF/YR.	AG Q	UNIT COST	M AND I				ANNUAL COST x 10^{-3}
				PA	UNIT COST	SBA	UNIT COST	
1964	23.5	11.9	3.50	—	—	11.6	10.00	157.6
1965	51.6	25.7	3.50	—	—	25.9	10.00	349
1966	70.5	34.4	3.50	—	—	36.1	10.00	481.4
1967	72.0	—	—	—	—	72.0	3.50	252
1969	77.0	—	—	—	—	77.0	3.50	269.5
1970	80.0	35.1	3.50	14.9	10.00	30.0	4.68	412.3
1980	103.0	29.1	3.50	20.9	10.00	53.0	4.68	559
1981	104.5	27.2	3.50	22.8	10.00	54.5	6.30	666.5
1990	122.0	18.95	3.50	31.05	10.00	72.0	6.30	830.4
1994	140.0	18.6	3.50	33.4	10.00	88.0	6.30	953.5
2000	166.0	17.0	3.50	61.0	10.00	88.0	6.30	1224
2003	178.0	15.75	3.50	74.25	10.00	88.0	6.30	1352
2004	183.0	15.25	3.50	79.75	10.00	88.0	6.30	1405.3
2009	203.0	12.4	3.50	102.6	10.00	88.0	6.30	1623.8
2010	207.5	12.3	3.50	107.2	10.00	88.0	6.30	1669.4
2020	258.0	7.5	3.50	162.5	10.00	88.0	6.30	2205.7

YEAR	MAX. HETCH HETCHY Q = 40,000 AF/YEAR							
	Q 1000 AF/YR	AG Q	UNIT COST	M AND I				ANNUAL COST x 10^{-3}
				PA	UNIT COST	SBA	UNIT COST	
1964	23.5	11.9	3.50	—	—	11.6	10.00	157.7
1965	51.6	25.7	3.50	—	—	25.9	10.00	349
1966	70.5	34.4	3.50	—	—	36.1	10.00	481.4
1967	72.0	—	—	—	—	72.0	3.50	252
1969	77.0	—	—	—	—	77.0	3.50	269.5
1970	80.0	35.1	3.50	14.9	10.00	30.0	4.68	412.3
1979	88.0	29.8	3.50	20.2	10.00	38.0	4.68	484
1980	90.0	29.1	3.50	20.9	10.00	40.0	4.68	498
1990	109.0	18.95	3.50	31.05	10.00	59.0	6.30	748.5
1997	140.0	17.9	3.50	34.1	10.00	88.0	6.30	958
2000	152.5	17.0	3.50	48.5	10.00	88.0	6.30	1099
2003	164.5	15.75	3.50	62.25	10.00	88.0	6.30	1232
2004	169.5	15.25	3.50	66.75	10.00	88.0	6.30	1275.3
2009	190.0	12.4	3.50	89.6	10.00	88.0	6.50	1493.8
2010	194.5	12.3	3.50	94.2	10.00	88.0	6.30	1539.5
2020	245.0	7.5	3.50	149.5	10.00	88.0	6.30	2075.7

YEAR	MAX. HETCH HETCHY Q = 115,000 AF/YEAR							
	Q 1000 AF/YR.	AG Q	UNIT COST	M AND I				ANNUAL COST x 10^{-3}
				PA	UNIT COST	SBA	UNIT COST	
1964	23.5	11.9	3.50	—	—	11.6	10.00	157.7
1965	51.6	25.7	3.50	—	—	25.9	10.00	349
1966	70.5	34.4	3.50	—	—	36.1	10.00	481.4
1967	72.0	—	—	—	—	72.0	3.50	252
1969	77.0	—	—	—	—	77.0	3.50	269.5
1970	86.0	35.1	3.50	14.9	10.00	30.0	4.68	412.3
1980	86.0	29.1	3.50	20.9	10.00	36.0	4.68	479.3
1981	86.5	28.0	3.50	22.0	10.00	36.5	6.30	548.0
1990	92.0	18.95	3.50	31.05	10.00	42.0	6.30	641.4
2000	119.0	17.0	3.50	33.0	10.00	69.0	6.30	824.2
2003	125.0	15.75	3.50	34.25	10.00	75.0	6.30	865.0
2004	127.0	15.24	3.50	34.76	10.00	77.0	6.30	881.0
2009	136.5	12.4	3.50	37.6	10.00	86.5	6.30	964.4
2010	138.0	12.3	3.50	37.7	10.00	88.0	6.30	974.5
2020	176.0	7.5	3.50	74.5	10.00	88.0	6.30	1325.7

CALCULATION SHEET

BY JMS DATE 11-14-61 SUBJECT REPAYMENT SHEET NO. 29 OF 40
CHKD. BY .... DATE .... INTERIM SOUTH BAY AQUEDUCT JOB NO. 61-90

INTERIM PROJECT S.B.A.

INITIAL CONSTRUCTION TO 88,000 AF

$12,900,000 40 YRS @4% 0.5052 $650,000

ADDITIONAL 88,000 AF CAPACITY

$19,413,000 40 @ 4 .05052 $981,000

COMPLETE INTERIM WORKS

$15,110,000 (COST ESTIMATE BY C&D)

40 @ 4 .05052 764,000

FOR 176,000 AF $2,395,000

ADDITIONAL 88,000 AF CAPACITY

19,413,000 40 @ 4 .05052 981,000

FOR 264,000 AF $3,376,000

COST FOR ESCALATION IN CONST. COST

YEAR	TIME FROM 1970	TOTAL @ 3%/YR	PRESENT COST	TOTAL ESCALATION	REPAYMENT (40@4%) .05052
1974	3	9	$19,413,000 15110,000	$3,100,000	$157,000
1979	8	24	" "	8,280,000	419,000
1984	13	39	" "	13,300,000	680,000
2003	32	96	19,413,000	18,600,000	942,000
2006	35	105	19,413,000	20,400,000	1,030,000

CALCULATION SHEET

BY JMS DATE 11-14-61 SUBJECT REPAYMENT SHEET NO. 30 OF 40
CHKD. BY DATE SOUTH BAY AQUEDUCT JOB NO. 61-90

S.B.A.

INITIAL CONSTRUCTION TO 88,000 AF

$19,413,000 40 YRS @ 4% 0.05052 $ 980,750

ADDITIONAL 88,000 AF CAPACITY 980,750

FOR 176,000 AF $1,961500

" " " " " " 980,750

FOR 264,000 AF $2,942,000

COST FOR ESCALATION IN CONST. COST.

				CAPITAL COST	REPAYMEN
1974	4 YR.	3%/YR	12%	1,740,000	$118,000
1979	9 YR	"	27%	5,240,000	265,000
1984	14 YR	"	42%	8,150,000	412,000
2002	32 YR	"	96%	18,600,000	936,000
2006	36 YR	"	108%	20,900,000	1,060,000

CALCULATION SHEET

BY JMS DATE 11-14-61 SUBJECT REPAYMENT SHEET NO. 31 OF 40
CHKD. BY .... DATE .... PACHECO AQUEDUCT JOB NO. 61-90

PACHECO AQUEDUCT

REACH	TOTAL COST	115 000 AF H.H.		40,000 HH		27 000 HH	
		S.C. WATER / TOTAL WATER	S.C. $ SHARE	S C / TOTAL	S C $ SHARE	S.C. / TOTAL	S C SHAR
SAN LUIS - HOLLISTER	26,581,000	5,615/9955	15,050,000	7105/11,445	16,500,000	7742/12,082	17,020,0
HOLLISTER - WATSONVILLE	6,340,000	5615/8565	4,170,000	7105/10055	4,480,000	7742/10,693	4,600,00
ATSONVILLE - SOUTH S.C.	4,780,000	5615/7175	3,750,000	7105/8665.	3,920,000	7742/9300	3,980,00
OUTH S.C. - SANTA CLARA	3,967,000	5615/5615	3,967,000	7105/7105	3,967,000	7742/7742	3,967,0
TOTAL	41,668,000		26,937,000		28,867,000		29,567,0
AGRI. WATER %			20.08		15.8		14.55
AGRI. SHARE			5,400,000		4,570,000		4,315,00
" " REPAY 40 @ 0%			135,000		114,200		108,00
M & I WATER %			79.92 %		84.2		85.45
" " SHARE			21,600,000		24,300,00		25,252,0
" " REPAY 40 @ 2½% (.03984)			865,000		968,000		1,010,000
TOTAL REPAY			1,000,000		1,082,000		1,118,000

TOTAL WATER TO BE SUPPLIED 1970 - 2020

ACRE FEET

5,615,000
7,105,000
7,742,000

} ESTIMATED TOTAL WATER SUPPLIED TO SANTA CLARA BY PACHECO AQUEDUCT BETWEEN 1970 & 2020

1,560,000	ESTIMATED SUPPLY TO SOUTH SANTA CLARA - USBR Est.
1,390,000	ESTIMATED SUPPLY TO WATSONVILLE - USBR ESTIMATE
1,390,000	ESTIMATED SUPPLY TO HOLLISTER - USBR ESTIMATE
4,340,000	TOTAL SUPPLY TO "OTHERS" 1970 - 2020

CIVIL ENGINEERS

CALCULATION SHEET

BY JMS DATE 11-14-61 SUBJECT REPAYMENT SHEET NO. 32 OF 40
CHKD. BY ______ DATE ______ INTERIM PACHECO AQUEDUCT JOB NO. 61-90

PACHECO INTERIM

FIRST STAGE $20,600,000 40 @ 4% (.05052) $1,040,000

	115 000 AF HH	40 000 AF H.H	27 000 AF HH
FIRST STAGE	$20,600,000		
COST ADDITIONS	+23,752,000		
TOTAL INTERIM COST	44,352,000		
TOTAL COST BY USBR	-41,668,000		
ADDITIONAL COST FOR INTERIM	$2,684,000	$2,684,000	$2,684,000
S.C. COUNTY SHARE OF USBR COST	+26,937,000	+28,867,000	+29,567,000
TOTAL COST TO SC	29,621,000	31,551,000	32,251,000
CREDIT FOR INTERIM	-20,600,000	20,600,000	20,600,000
BALANCE DUE BY SANTA CLARA	9,021,000	10,951,000	11,651,000
AGRI. PORTION	-5,400,000	-4,570,000	-4,315,000
NET DUE	3,621,000	6,381,000	7,336,000
REPAY 40 @ 2½%	144,000	254,300	292,000
AGRI. REPAY 40 @ 0%	+135,000	+114,000	+108,000
TOTAL REPAY TO USBR	$279,000	$368,300	$400,000

CIVIL ENGINEERS

CALCULATION SHEET

BY JMS DATE 11-14-61 SUBJECT REPAYMENT SHEET NO. 33 OF 40
CHKD. BY .... DATE .... PACHECO & SOUTH BAY COMBINATION JOB NO. 61-90

PACHECO & SBA

SBA	$19,413,000	40@4%	$980,750

PACHECO

		115 000 HH		40 000 HH		27000 HH	
REACH	TOTAL COST	SC WATER / TOTAL WATER	SC SHARE	SC / TOTAL	S.C. SHARE	SC / TOTAL	S.C. SHAR
S LUIS- HOLL.	26,581,000	2660/7000	10,100,000	3651/7991	12,140,000	4004/8334	12,780,00
OLL.- WATSON.	6,340,000	2660/5510	3,000,000	3651/6601	3,510,000	4004/6954	3,640,00
ATSON- S. S.C.	4,780,000	2660/4220	3,150,000	3651/5211	3,340,000	4004/5564	3,430,00
S S.C. - SANTA C.	3,967,000	2660/2660	3,967,000	3651/3651	3,967,000	4004/4004	3,967,00
TOTAL	41,668,000		20,217,000		22,957,000		23,837,00
AGRI. WATER %			42.5%		30.95%		28.7 %
" SHARE			8,690,000		7,100,000		6,880,00
" " REPAY 40@0%			215,000		177,500		168,000
& I %			57.5 %		69.05 %		71.3 %
" " SHARE			11,577,000		15,857,000		16,957,00
" REPAY 40@2½%			462,000		632,000		676,00
TAL REPAY			$677,000		$809,500		$844,00

CIVIL ENGINEERS

CALCULATION SHEET

BY JMS	DATE 11-14-61	SUBJECT POWER COSTS	SHEET NO. 34 OF 90
CHKD. BY	DATE	SOUTH BAY AQUEDUCT	JOB NO 61-90

ANNUAL POWER COST = $\frac{.746}{8.84}\ \frac{43560}{3600}\ \frac{\text{LIFT}}{\text{EFFICIENCY}}$ IMPORT (AF/YR.) \$/K

FOR 1 A.F./YR @ 80% EFFICIENCY

COST OF POWER = $\frac{.746}{8.84}\ \frac{43560}{3600}\ \frac{\text{LIFT}}{0.80}$ (1 AF/YR) \$/KWH

COST OF POWER = (LIFT) (\$/KWH) 1.28

FOR SBA

1964 - 1966 LIFT = 755 - 191 = 564' (LIFT FROM DELTA-MENDOTA CANAL)
POWER COST = \$0.004/KWH

ANNUAL POWER COST/AF = 564 0.004 1.28
= \$2.88/A.F.

1967 - 1968 LIFT 755'
POWER \$0.004/KWH

ANNUAL POWER COST = 755 0.004 1.28
= \$3.85/AF

1969 - THEREAFTER LIFT 755'
POWER \$0.008/KWH

ANNUAL POWER COST = 755 0.008 128
= \$7.70/AF.

CIVIL ENGINEERS

CALCULATION SHEET

BY JMS DATE 11-14-61 SUBJECT POWER COSTS SHEET NO. 35 OF 40
CHKD. BY DATE INTERIM SOUTH BAY AQUEDUCT JOB NO. 61-90

FOR INTERIM SBA.		SBA	INTERIM
1964-1966	LIFT	755-191 = 564	474'
	POWER COST	$0.004/KWH	0.008
	ANNUAL POWER COST =	564 0.004 1.28	474 .008 128
		= 2.88	4.85
		TOTAL = $7.73	
1967-1968	LIFT	755	
	POWER COST	$0.004/KWH	"
	ANNUAL POWER COST =	7.55 0.004 1.28	"
		= $3.85	= $4.85
		TOTAL $8.70	

1969 - TILL PERMANENT WORKS CONSTRUCTED
(WHEN IMPORT REACHES 88,000 AF/YR.

LIFT 1229'

POWER COST $0.008/KWH.

ANNUAL POWER COST = 1229' 0.008 1.28

= $12.55/AF

AFTER PERMANENT WORKS CONSTRUCTED SAME COST AS S.B.A. — $7.70/A.F.

BY JMS DATE 11-14-61 SUBJECT POWER COSTS SHEET NO. 36 OF 40
CHKD. BY DATE PACHECO AQUEDUCT JOB NO. 61-90

FOR PACHECO AQUEDUCT

PRIOR TO 1970 LIFT 1235'
POWER $0.004/KWH
ANNUAL POWER COST = 1235 0.004 1.28
= $6.30/AF

1970 & AFTER LIFT 375'
POWER $0.004/KWH
ANNUAL POWER COST = 375 0.004 1.28
= $1.90/AF

AT ANDERSON DAM

ASSUME 50% ANNUAL IMPORT PUMPED 120'
LIFT. 120'
POWER $0.004/KWH.
ANNUAL POWER COST = 120 .004 1.28
= $0.60/A.F.
USE 50% OR $0.30 FOR TOTAL IMPORT

CIVIL ENGINEERS

CALCULATION SHEET

BY JMS DATE 11-14-61 SUBJECT MAINTENANCE & OPERATION SHEET NO. 37 OF 40

CHKD. BY .... DATE .... JOB NO. 61-90

S. B. A.

SANTA CLARA COUNTY SHARE OF CAPITAL COSTS

BASED ON ESTIMATE GIVEN TO SCCFC & WCD BY CALIF. DEPT. OF WATER RESOURCES

FACILITY	EST COST.	MAINTENANCE FACTOR	MAIN. COST
PIPELINES	$8,900,000	0.25 %	22,300
PUMP. PLANTS	2,725,000	2.2 %	60,000
CANAL	2,400,000	0.60 %	14,400
RESERVOIRS	3,138,000	0.25 %	7,800
TUNNELS	2,250,000	0.05 %	1,100
		SUB. TOTAL	105,600
PUMPING PLANT OPERATION		$90,000	
S.C. COUNTY SHARE	88/210	90,000	37,500
		TOTAL	143,100

S.B.A. M & O USE $140,000

INTERIM S.B.A.

PUMP PLANTS (CAPITAL COSTS FROM C & D ESTIMATE)			
@ DELTA	2,725,000	2.2 %	60,000
@ NILES	1,730,000	2.2 %	38,100
PIPE LINE			
@ DELTA	3,000,000	0.25%	7,500
@ NILES - AIRPOINT	5,500,000	0.25 %	13,800
CANAL	0		–
RESERVOIR	0		–
TUNNEL	0		–
PUMP STA. SALARIES			90,000
		TOTAL.	$ 209,400

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W.	DATE 11-61	SUBJECT WATER TREATMENT COSTS	SHEET NO. 39 OF 40
CHKD. BY J.M.S.	DATE	HETCH HETCHY = 27,000 AF./YR MAX.	JOB NO. 61-90

YEAR	"Q" TREATED IN AC. FT.	MAINTENANCE & OPERATION $/AC. FT.	COST IN $1000	PRINCIPAL & INTEREST IN $1000	TOTAL COST	REMARKS
1970	■					■ INITIAL 10 M.G.D. PLANT $3,400,00
1974	8,000	$10.00	.080	.172	.252	
1975	9,000	9.64	.087	.172	.259	
1980	17,000	7.35	.125	.172	.297	
1981	19,000	7.00	.133	.172	.305	
1984	■					■ 10 M.G.D. PLANT ADDED $3,100,000
1985	23,000	6.50	.150	.329	.479	
1990	30,000	5.79	.174	.329	.503	
1994	36,000	5.38	.194	.329	.523	
1998	■					■ 10 M.G.D. PLANT ADDED $4,110,000
2000	46,000	4.84	.223	.535	.758	
2002	51,000	4.65	.237	.535	.772	
2003	53,000	4.60	.244	.535	.779	
2004	55,000	4.52	.249	.535	.784	
2008	■					■ 10 M.G.D. PLANT ADDED $4,830,000
2009	66,000	4.20	.277	.779	1.056	
2010	69,000	4.12	.284	.779	1.063	
2013	■ 74,000	4.00	.296	.779	1.075	■ END INITIAL PLANT REPAYMENT PERIO
2014	77,000	3.92	.302	.607	.909	
2020	88,000	3.72	.327	.607	.934	

CIVIL ENGINEERS

CALCULATION SHEET

BY JMS DATE 11-15-61 SUBJECT MAINTENANCE & OPERATION SHEET NO. 38 OF 40
CHKD. BY .... DATE .... JOB NO. 61-90

INTERIM PACHECO

FACILITY	EST. COST.	MAIN. FACTOR	MAIN. COST.
PIPELINES	1,175,000	0.25 %	$ 2,940
SIPHONS	3,330,000	0.25 %	8,325
CANAL	12,815,000	0.60 %	77,000
PUMP. PLANTS	2,825,000	2.2 %	62,200
PUMP. PLANT	MANPOWER		90,000
		TOTAL	$ 240,465

PACHECO

FACILITY	EST. COST	MAIN. FACTOR	MAIN. COST.
PIPELINES	1,500,000	0.25 %	$ 3,750
SIPHONS	9,330,000	0.25%	23,300
CANAL	13,737,000	0.60 %	83,000
PUMP PLANT	2,900,000	2.2 %	64,000
PUMP PLANT MANPOWER			90,000
TUNNEL	12,000,000	0.05 %	6,000
		TOTAL	$ 270,050

ASSUME COST OF MAINTENANCE SHARED ON BASIS OF WATER USE $\frac{5600}{9960}$ $270,000 = 152,000

PUMP. PLANT @ ANDERSON	2,050,000	2.2 %	45,000

USE ALL PLANS ⟶ TOTAL SC. COUNTY $ 197,000

CIVIL ENGINEERS

CALCULATION SHEET

BY H.W. DATE 11-61 SUBJECT WATER TREATMENT COSTS SHEET NO. 40 OF 40

CHKD. BY J.M.S. DATE HETCH HETCHY = 40,000 A.F./YR. MAX. JOB NO. 61-90

YEAR	"Q" TREATED IN AC.FT.	MAINTENANCE & OPERATION		PRINCIPAL & INTEREST IN $1,000	TOTAL COST	REMARKS
		$/AC. FT.	COST IN $1000			
1980	■ 4,000	$15.00	.060	.203	.263	■ INITIAL 10 M.G.D. PLANT $4,020,00
1981	5,500	12.00	.066	.203	.269	
1989	14,000	7.95	.111	.203	.314	
1990	17,000	7.35	.125	.203	.328	
1993	■					■ 10 M.G.D. PLANT ADDED $3,750,00
1997	29,000	5.80	.168	.392	.560	
2000	33,000	5.58	.184	.392	.576	
2002	38,000	5.26	.200	.392	.592	
2003	40,000	5.14	.206	.392	.598	
2004	42,000	5.02	.211	.392	.603	
2005	■ 45,000	4.90	.221	.626	.847	■ 10 M.G.D. PLANT ADDED $4,620,00
2006	47,000	4.82	.227	.626	.853	
2009	53,000	4.60	.244	.626	.870	
2010	56,000	4.50	.252	.626	.878	
2014	■					■ 10 M.G.D. PLANT ADDED $5,260,00
2018	70,000	4.10	.287	.892	1.179	
2019	72,000	4.05	.292	.892	1.184	
2020	75,000	3.95	.296	.689	.985	